January 2021

ENVIRONMENTAL ASSESSMENT FOR THE

Stanislaus National Forest Prather-Medusa Forest Resilience Project

PREPARED FOR:

National Fish and Wildlife Foundation
and Stanislaus National Forest

Final Environmental Assessment
for the
Prather-Medusa Forest Resilience Project

Calaveras Ranger District, Stanislaus National Forest

Tuolumne County, California

Prepared for

Stanislaus National Forest

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1. INTRODUCTION

The U.S. Department of Agriculture Forest Service (USDA) prepared this Environmental Assessment (EA) in compliance with the National Environmental Policy Act (NEPA) and other relevant Federal and State laws and regulations. This EA discloses the direct, indirect and cumulative environmental impacts that would result from the proposed action and alternatives. Additional documentation, including more detailed analyses of project-area resources, are available online at https://www.fs.usda.gov/project/?project=57099.

1.1. Background and Context

The Prather Medusa Project is located in the general area of Prather Meadows, Big Rattlesnake Creek, and Little Rattlesnake Creek (Prather-Medusa Forest Resilience project). The project is located on the Calaveras Ranger District in Tuolumne County, California, northeast of Arnold and south of Cabbage Patch, on the south side of the North Fork Stanislaus River (Figure 1-1). The project area is within the Boards Crossing, Calaveras Dome, Liberty Hill, and Tamarack United States Geological Survey (USGS) 7.5 minute Quadrangle Maps, in all or portions of Township 6N, Range 16E Sections 13, 23-25; Township 6N Range 17E Sections 7-10, 15-18, 19-22, 28-32. Elevations in the 7,132-acre project area range between approximately 5,000-7,600 feet.

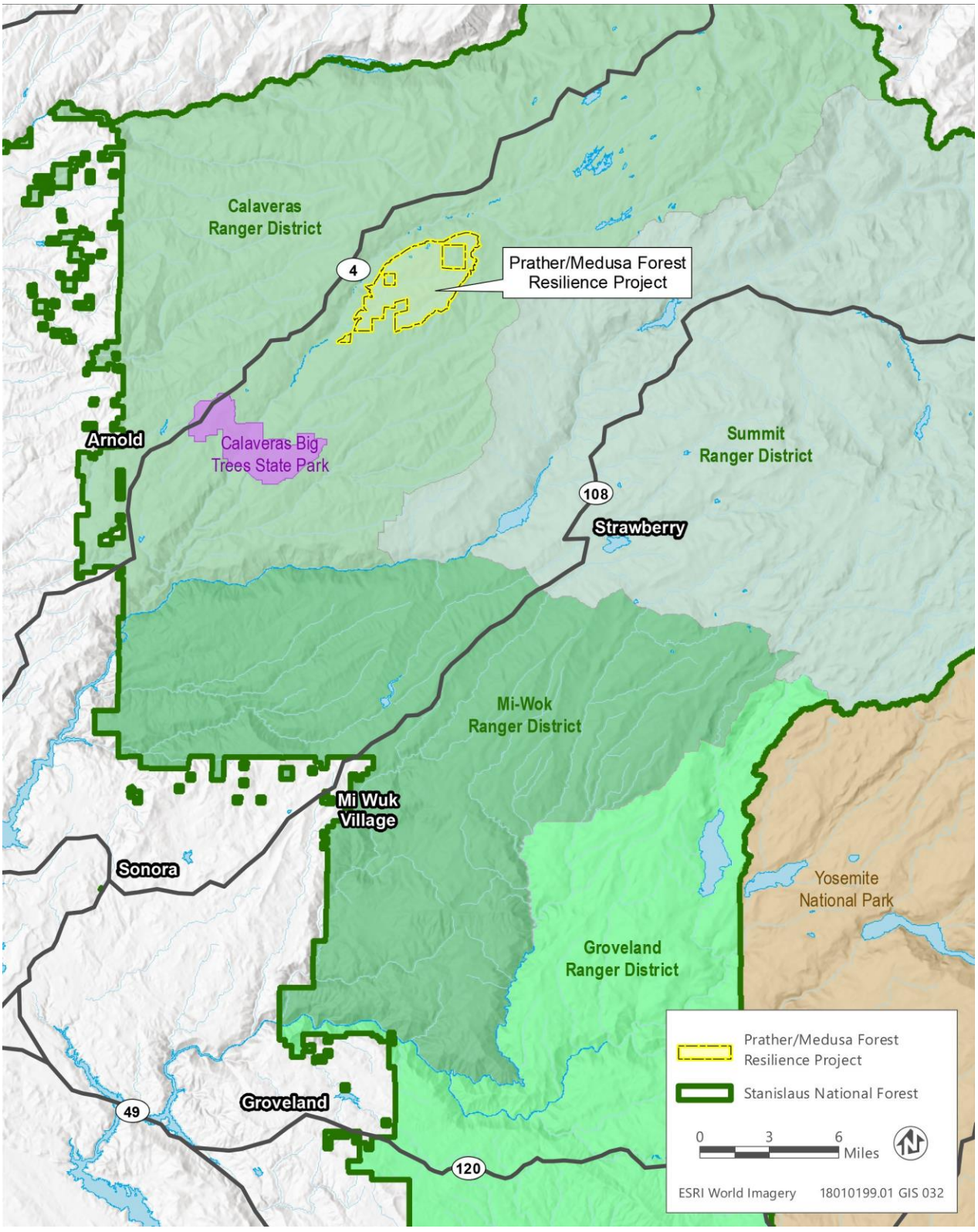


Figure 1-1 Prather Medusa Forest Resilience Project Vicinity

1.2. Purpose and Need

A history of fire exclusion policies has led to high-density, high-fuel load forest conditions within the project area, making it vulnerable to catastrophic wildfire. At the same time, historic preferential harvesting of larger diameter trees has resulted in overall smaller tree sizes. Combined, these practices have led to a lack of diversity in age, diameter, density, species composition, and vertical structure of the forest, resulting in an overabundance of smaller, younger, shade-tolerant and less fire-resistant trees, especially white fir. The current, homogenous forest composition is vulnerable to increased patterns of insect and pathogen outbreaks at landscape and ecosystem scales. These outbreaks reinforce the shift in vegetative species composition and stand structure, while further increasing hazardous surface fuel loads. Drought has also been a factor influencing forest conditions within the project area, with below average precipitation in the Sierra climate region in 12 of the last 19 years preceding 2019 (2000 through 2018) (WRCC 2020). Drought, fire exclusion and preferential harvesting practices, have been factors contributing to physiological stress on individual trees, reducing their resilience to pathogens, pests, and wildfire. Fir mortality is high under drought conditions; therefore, as temperatures rise and drought continues to become more prevalent with climate change, stressors are expected to increase. The current forest conditions make the project area susceptible to high intensity stand-replacing wildfire. Such a fire would degrade important habitat for old growth forest species, including California spotted owl and northern goshawk.

Management action is needed to achieve project objectives and transition the project area toward desired conditions for relevant Management Areas and Land Allocations as identified in the Forest Plan (USDA 2017). Fuel characteristics both within and outside of the Wildland Urban Intermix (WUI) must be modified to reduce fire behavior and burn severity and protect human communities from wildfires. A change in fuel characteristics can be accomplished by land management practices that reduce surface and ladder fuels and decrease forest density. Fuel reduction also increases the efficiency of firefighting efforts and reduces the risk to firefighters, the public, facilities and structures, and natural resources. Further, forest management is necessary to increase forest resilience to insects, diseases, and other disturbance agents by reducing stand density and increasing stand structural diversity and composition. These actions are especially needed in overstocked plantations, areas with past salvage logging, stands with severe dwarf mistletoe infection, and in areas with a decreasing old growth pine component.

Active management is needed to further transition forested environments into resilient ecosystem communities. Without active management, stand densities, tree mortality and fuel accumulations would increase, resulting in increased risk of stand replacing fires. Mosaic patterns of stand composition, species, and structure inhibit bark beetle distribution, even when environmental conditions are favorable. Other species, such as incense cedar, Jeffrey pine, lodgepole pine, and sugar pine, should be encouraged to increase species diversity. The health of fir forests can benefit by altering their structure or composition.

There is a need to manage and protect mature forest dependent species and to increase and perpetuate mature forest ecosystems. Management practices (e.g., mechanical thinning and fuel reduction) that use a mosaic design when altering forest structure would benefit mature forest species. Benefits from managing for a mosaic design include maintaining connectivity and suitable habitat for mature forest species and their prey, while protecting these overall habitats from catastrophic wildfire. Regeneration of forest stand may be improved with a light thin (< 10% in

most areas) of suppressed trees or a light to moderate surface burn. Prey availability and abundance may be enhanced with a mosaic of light and moderate surface fire that would also reduce surface fuels concerns

Aspen stands and meadows in the Sierra Nevada are ecologically significant because of their rarity and the potential to host high levels of biological diversity (Manley et al. 2000). However, aspen stands in the project area exhibit low stand recruitment and reduced density and extent. Encroaching conifers in aspen stands and meadows in the project area are threatening the integrity and sustainability of these habitats. Proper hydrologic processes may also be impaired, compounding stressors to the aspen stands and promoting conditions for further conifer encroachment. Management is needed to remove competing conifers and expand the boundaries of special aquatic features in the project area.

The objectives of the Prather-Medusa Forest Resilience Project are to:

- Increase tree, stand, and landscape resiliency and sustainability by producing different stand structures and densities across the landscape.
- Enhance the general health of forested stands and reduce susceptibility to insect infestations, diseases, and drought-related mortality by reducing stand density.
- Improve and promote stand and individual tree growth and vigor.
- Reduce future fire intensity and severity by reducing surface ladder fuels, increasing the height to canopy, decreasing crown density, and retaining large, fire-resistant tree species.
- Maintain and enhance important wildlife habitat, mature forest ecosystem values, and connectivity of mature forest stands.
- Maintain and enhance the extent and connectivity of aspen stands and meadows by reducing encroaching conifers.

1.3. Forest Plan Direction

The Forest Service completed the Stanislaus National Forest Land and Resource Management Plan on October 28, 1991. The Stanislaus National Forest, Forest Plan Direction (Forest Plan; USDA 2017) presents the current Forest Plan management direction, based on the original Forest Plan as amended. The Forest Plan includes forest wide standards and guidelines (pages 33-64) and Management Areas that apply to this project including: Near Natural (pages 119-122), Wildlife (pages 123-127), Scenic Corridor (pages 155-160), and General Forest (pages 161-164). Land Allocations with associated management intent and objectives that also apply include: Protected Activity Centers (pages 183-186), Home Range Core Areas (pages 188-189), Wildland Urban Intermix (pages 189-190), Old Forest Emphasis Area (pages 190), General Forest (pages 191) and Riparian Conservation Areas (pages 191-195).

1.4. Public Involvement

Information pertaining to the scope of the Prather Medusa Resilience Project were shared with the Tuolumne Band of Me-Wuk, Washoe Tribe of Nevada and California and the California Valley Miwok Tribe also known as the Sheep Ranch Rancheria of Me-Wuk Indians of

California during a meeting on June 4th, 2019. The project first appeared in the Stanislaus National Forest "virtual" Schedule of Proposed Actions (SOPA) [http://www.fs.fed.us/sopa/forest-level.php?110516] on October 31, 2019 and the project first appeared in the published quarterly SOPA in January 2020. The Forest shared project information during a designated scoping comment period between November 12 and December 12, 2019. During this scoping period the Forest sent project information to and solicited project feedback and specific written comments regarding the proposed action from, 2 individuals and Sierra Pacific Industry (SPI).

Three interested parties (John Muir Project of Earth Island Institute/Center for Biological Diversity, Sierra Pacific Industries, and a livestock grazing permittee) submitted comments during the designated scoping comment period. Comments were addressed during the development of the Environmental Assessment.

The Forest Service formally requested comments on the Prather Medusa Resilience project during a 30-day designated opportunity for public participation (35 CFR 218.5(a)) between September 17th and October 17, 2020. A legal notice advertising the Opportunity to Comment, and providing a weblink to project documents, including the Environmental Assessment, was published in the Union Democrat on September 17, 2020. In addition, the Forest Supervisor mailed a letter directly to over 450 individuals and organizations to solicit comments and feedback on the prepared Environmental Assessment. Those contacted included those who expressed a specific interest in the project or those that the Responsible Official determined may be directly or indirectly affected by the proposed project. The Forest Service received four comment letters during the designated 30-day comment period, and the EA was revised in response to these comments.

1.5. Relevant Issues

Stanislaus National Forest staff reviewed the purpose and need, proposed action and scoping comments to identify issues. An issue is a point of discussion, dispute, or debate with the proposed action; an issue is an effect on a physical, biological, social, or economic resource; an issue is not an activity; instead, the predicted effects of the activity create the issue. Issues are then separated into two groups: relevant and non-relevant issues.

Relevant issues are defined as those directly or indirectly caused by implementing the proposed action. Issues are relevant because of the extent of their geographic distribution, the duration of their effects, or the intensity of interest or resource conflicts. In the context of the proposed action, relevant issues have been used to prescribe requirements and analyze environmental effects.

Non-relevant issues are those identified as: 1) outside of the scope of the proposed action; 2) already determined through law, regulation, Forest Plan, or other higher level decision; 3) irrelevant to the decision to be made; 4) conjectural and not supported by scientific fact; 5) a comment, opinion, or position statement; or, 6) a question for clarification or information.

Based on the comments received during public scoping the interdisciplinary team identified the following relevant issues.

1. **Effects on sensitive wildlife species**: The proposed action has the potential to directly, indirectly, and cumulatively impact sensitive wildlife and their habitats.
2. **Feasibility:** The feasibility of implementing the proposed action is reliant on number of factors, including the economic viability of a timber sale, which is affected by the ability to

harvest trees and the amount of sawtimber per acre harvested.

2. ALTERNATIVES

Proposed Action

The proposed action includes approximately 5,687 acres of forest resilience treatments within the 7,132-acre project area (Table 2-1). The proposed vegetation management actions vary across six treatment categories, referred to as "treatment emphasis areas" as listed in Table 2-1. The suite of treatment tools that will be utilized to implement the proposed actions also vary by treatment emphasis area. Figure 2-1[1] displays the spatial distribution of treatment emphasis areas.

Table 2-1 Treatment Emphasis Areas and Treatment Tools

Treatment Emphasis Area	Treatment Tools	Acres
General Forest	• Biomass Removal • Hand Thinning • Mastication • Mechanical Thinning • Prescribed Burning • Salvage	1,879
Protected Activity Centers	• Hand Thinning • Prescribed Burning	1,194
	• Mechanical Thinning (within WUI defense zone only[2])	77
Home Range Core Areas	• Biomass Removal • Hand Thinning • Mastication • Mechanical Thinning • Prescribed Burning • Salvage	871
Fuel break	• Biomass Removal • Hand Thinning • Mastication • Mechanical Thinning • Prescribed Burning • Salvage	263
Plantations	• Biomass Removal • Hand Thinning • Mastication • Mechanical Thinning • Prescribed Burning	1,209
Aspen Stands and Meadows	• Biomass Removal • Hand Thinning • Mastication • Mechanical Thinning • Prescribed Burning • Salvage	194

[1] Acres may be modified before implementation after the completion of protocol-level surveys for northern goshawk and California spotted owl. Upon completion of these surveys, the protected activity centers (PACs) and home range core area (HRCA) boundaries may be adjusted to include the most recent known nest sites and to include the best available forested habitat. If adjustments to PACs or HRCAs occur, other treatment emphasis area locations and size may be affected.

[2] Consistent with Forest Plan Standard and Guideline #72: "Mechanical treatments may be conducted to meet fuels objectives in protected activity centers (PACs) located in WUI defense zones. In PACs located in WUI threat zones, mechanical treatments are allowed where prescribed fire is not feasible and where avoiding PACs would significantly compromise the overall effectiveness of the landscape fire and fuels strategy. Mechanical treatments should be designed to maintain habitat structure and function of the PAC." (Forest Plan 2017:181).

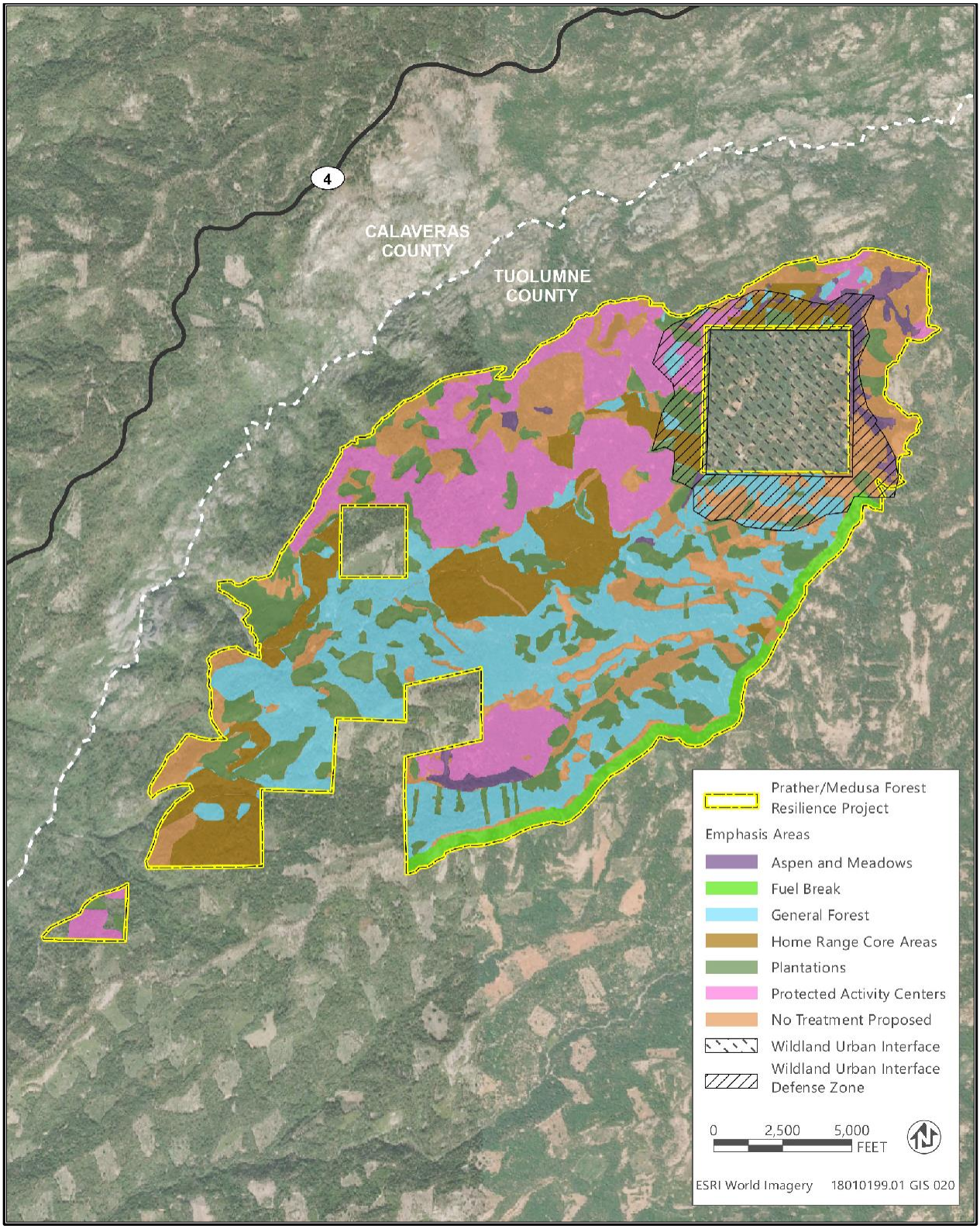


Figure 2-1 Approximate Locations of Treatment Emphasis Areas

Proposed Vegetation Management

Approximately 505 acres of treatments would occur within the WUI; of these acres, a maximum of 77 would be located within the WUI defense zone in PACs. The remainder of all treatments would occur outside of the WUI. Table 2-2 summarizes treatment prescriptions within each treatment emphasis area within and outside of the WUI. Additional details on treatment prescriptions within each treatment emphasis area are provided below.

Table 2-2 Treatment Emphasis Area Prescriptions

Treatment Emphasis Area Characteristics		Treatment Prescriptions				
Treatment Emphasis Area	**Within WUI?**	**Max live DBH to be removed (in.)**	**Target Canopy Cover*(%)**	**Avg. # Snags/ Acre**	**Spacing between residual crowns (ft.)**	**Mechanical treatment allowed?**
General Forest	No	30"	40%	4	N/A	Yes
General Forest	Yes	30"	40%	0	N/A	Yes
PACs	No	6"	60%	4	N/A	No
PACs	Yes	20"	50%	0	N/A	Yes
HRCAs	No	24/30"	50%	4	N/A	Yes
HRCAs	Yes	24/30"	40%	0	N/A	Yes
Fuel Break	No	30"	30%	0	15'	Yes
Plantations	No	20"	N/A	0	20'	Yes
Aspen Stands	N/A	40"	N/A	4	N/A	Yes
Meadows	N/A	30”	N/A	4	N/A	Yes

*Within areas that exhibit mature forest conditions before treatment, treatments will reduce canopy cover by no more than 30 percent from existing levels and will maintain a post-treatment canopy cover of at least 40 percent throughout the treated areas.

Treatments would be phased over several years throughout the project area. Priority areas would be identified each year during review of the schedule of work by Stanislaus National Forest leadership.

General Forest

The General Forest Treatment Emphasis Area is approximately 1,879 acres and consists primarily of mixed conifer and red fir forest types. Approximately 133 acres of this treatment emphasis area are within the WUI and 1,746 acres are outside of the WUI. Currently, there is a high percentage of mature forest across the project area, as shown in Figure 2-2. Areas exhibiting mature forest conditions would be managed to achieve more complete post-canopy cover than non-mature forest conditions (see the description of treatment actions, below). The full suite of treatment activities may occur within the General Forest Treatment Emphasis Area to produce a mosaic of different forest stand structures and densities across the landscape. Treatments would create forested stands diverse in vertical structure and species composition with a clumped distribution of varying tree sizes and age classes. Treatments would result in forest gaps with shrub patches of varying sizes and densities. Post-treatment stem density and canopy cover will be greatest in valley bottoms, drainages, and riparian areas and decrease over mid-slopes, becoming thinnest near ridgetops and

areas with thin soils. Stem density and canopy cover will be higher on north and east aspects than on south and west aspects, and decrease as slope becomes steeper. Treatments within the General Forest will include the following actions:

- To accomplish variable densities of trees, conifers less than 30 inches diameter at breast height (dbh) would be thinned to leave behind an uneven arrangement of individual trees, small groups or clumps, and openings within the stand.
- Within areas that exhibit mature forest conditions before treatment (see Figure 2-2), treatments will reduce canopy cover by no more than 30 percent from existing levels and will maintain a post-treatment canopy cover of at least 40 percent throughout the treated areas.
- In portions of the general forest that do not exhibit mature forest conditions (see Figure 2-2), sufficient dominant and co-dominant trees will be retained in each stand to result in an average post-harvest canopy cover of 40 percent, with a range from approximately 30 to 50 percent across the live portion of stands.
- The largest existing snags will be retained to achieve an average of four snags per acre greater than 15 inches dbh across the portions of the General Forest Treatment Emphasis Area that are outside of the WUI. Retained snags will be clumped and distributed irregularly across the treatment emphasis area. Within the WUI defense zone, no snags would be retained. Retained snags would be located away from structures, corrals, and fence lines.
- Healthy sugar pine without evidence of blister rust and Douglas fir would generally be prioritized for retention.
- Treatments would release black oaks greater than 12 inches dbh and healthy sugar pine without evidence of blister rust greater than 24 inches dbh from competition with other conifers. To achieve this, conifers up to 30 inches dbh within 20 feet of the dripline of a black oak or sugar pine would be removed.
- Hardwoods greater than 12 inches dbh and conifers 30 inches dbh or greater would be retained unless they pose a safety hazard.
- Stumps of cut tree species that are susceptible to Annosus root disease may be treated with a borax-based fungicide to minimize the spread of root disease. Treatments would be limited to areas near recreation sites, trail heads or other high use recreation areas.
- To avoid contributing to fuel loading, large cut vegetation will be piled, chipped, masticated or removed from the site.

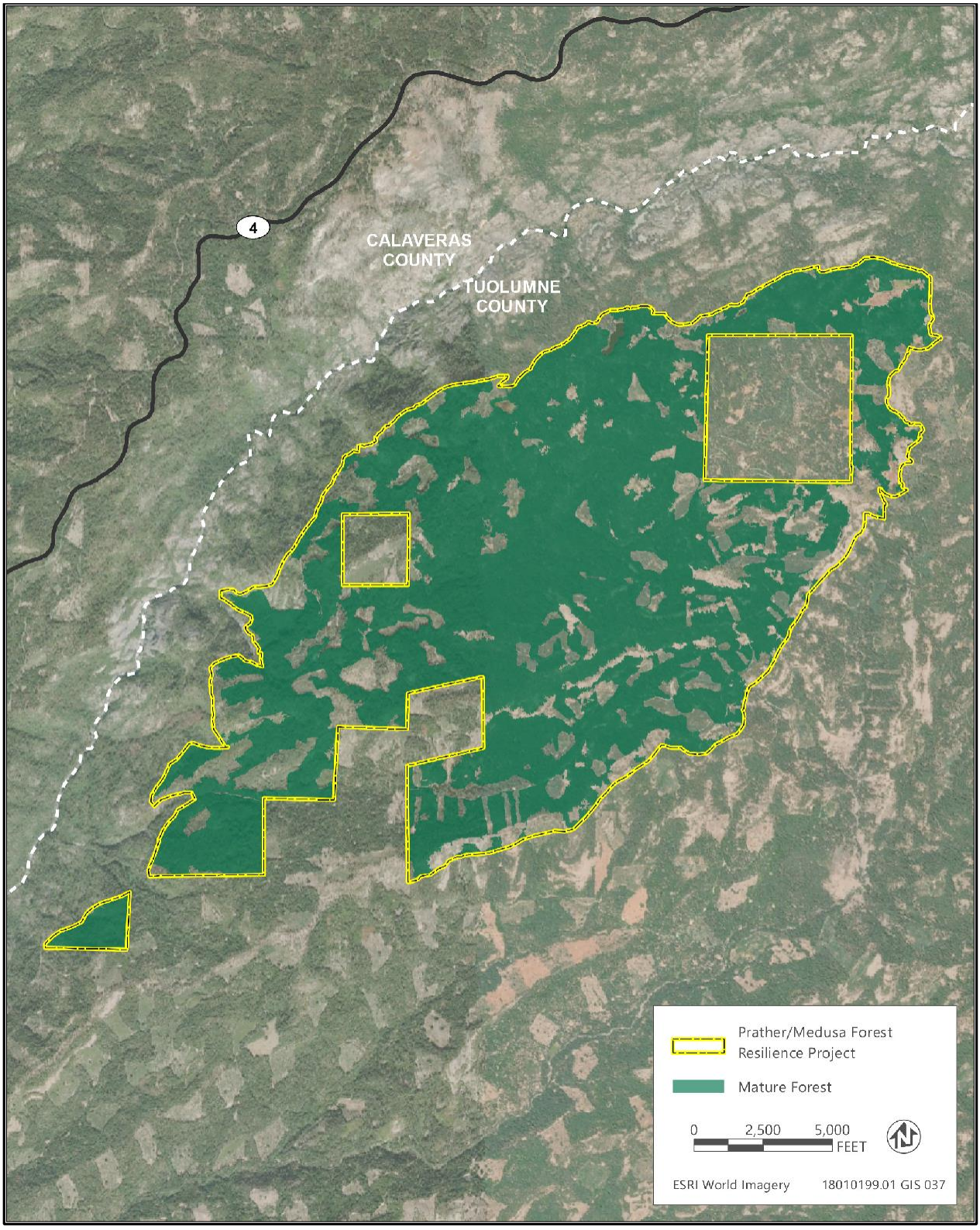


Figure 2-2 Prather Medusa Forest Resilience Project – Mature Forest

Protected Activity Centers

Treatments within California spotted owl and northern goshawk Protected Activity Centers (PACs) would be limited to hand thinning and prescribed burning, except within WUI defense zones where mechanical thinning may be implemented as needed to meet fuel reduction objectives. Mechanical treatments would also be prohibited within a 500-foot radius of identified California spotted owl activity centers within designated PACs, as identified during protocol-level surveys. All treatments with PACs would only occur outside of Limited Operating Periods (LOPs) during the active nesting season for these species. Treatments within PACs would include the following actions:

- Outside of the WUI trees less than 6 inches dbh would be selected for thinning and within the WUI trees less than 20 inches dbh would be selected for removal while retaining at least two canopy layers.
- Inside the WUI, in areas within a 500-foot radius of an identified California spotted owl activity center, trees less than 6 inches dbh would be selected for thinning.
- Treatments would thin canopy cover to between 60 to 70 percent cover immediately following treatment for areas outside of the WUI. Within the WUI, treatments would maintain at least 50 percent canopy cover.
- Where existing canopy cover in PACs outside of the WUI is less than 60 percent, treatment activities would focus on removing ladder fuels without substantially decreasing canopy cover.
- The largest existing snags would be retained to achieve an average of four snags per acre greater than 15 inches dbh across the portion of each PAC outside of the WUI. Retained snags would be clumped and distributed irregularly across the PAC. Within the WUI, no snags would be retained. Retained snags would be located away from structures, corrals, and fence lines.
- A higher than average amount of downed woody material would be retained based onsite specific fuels conditions. Downed woody material in the largest size classes and in decay classes 1, 2, and 3 would be prioritized for retention.
- Healthy sugar pine without evidence of blister rust and Douglas fir would be prioritized for retention.
- Stumps of cut tree species that are susceptible to Annosus root disease may be treated with a borax-based fungicide to minimize the spread of root disease. Treatments would be limited to areas near recreation sites, trail heads or other high use recreation areas.

Home Range Core Areas

Treatments within California spotted owl Home Range Core Areas (HRCAs) could include the full range of treatment activities. Treatments within the HRCAs will include the following actions:

- For shade-tolerant species such as white fir and cedar, trees less than 30 inches dbh would be selected for thinning. For shade-intolerant species such as pine, tress less than 24 inches dbh would be selected for thinning.
- Treatments in HRCAs outside the WUI would thin canopy cover to between 50 to 70 percent cover immediately following treatment. Within portions of HRCAs within the WUI, a minimum of 40 percent canopy cover would be retained.
- Where existing canopy cover in HRCAs outside of the WUI is less than 50 percent, treatment activities would focus on removing ladder fuels without substantially decreasing canopy cover.
- Outside of the WUI, treatments would retain at least two canopy layers and an average size of at least 24 inches dbh for retained dominant and codominant trees.

- The largest existing snags will be retained to achieve an average of four snags per acre greater than 15 inches dbh across portions of each HRCA that are outside WUI. Retained snags would be clumped and distributed irregularly across the HRCA. Within the WUI, no snags would be retained. Retained snags would be located away from structures, corrals, and fence lines.
- Outside of the WUI, a higher than average amount of downed woody material would be retained based on-site specific fuels conditions. Downed woody material in the largest size classes and in decay classes 1, 2, and 3 would be prioritized for retention.
- Healthy sugar pine without evidence of blister rust and Douglas fir would be prioritized for retention.
- Stumps of cut tree species that are susceptible to Annosus root disease may be treated with a borax-based fungicide to minimize the spread of root disease. Treatments would be limited to areas near recreation sites, trail heads or other high use recreation areas.

Fuelbreak

A fuelbreak is proposed for approximately 5 miles along Forest Roads 6N07 and 6N27. This fuelbreak would be located on a strategic ridgetop and extend an existing fuelbreak adjacent and to the south of the project area. The fuelbreak would break up large expanses of continuous fuels, provide for firefighter access and safety, increase suppression opportunities, and provide pre-existing control points for prescribed fires. The full range of treatment activities could occur within the fuel break, which would include the following specific actions:

- The fuelbreak would extend 150 feet on either side of the centerline of Forest Roads 6N07 and 6N27 for a total fuelbreak corridor width of 300 feet.
- Continuous vegetation under 12 feet tall would be removed to create naturally appearing islands of varied size and shape that do not provide horizontal fuel continuity across the fuel break or act as a fire ladder into overstory vegetation. Shrub species over 1 foot in height would be removed to develop vertical separation between the ground and the canopy of retained trees. Grass and forbs are not required to be treated. To promote habitat diversity and soil cover, up to 25 percent of understory vegetation may be retained outside of tree driplines.
- Existing vegetation would be thinned to a spacing of approximately 15 feet between the driplines of residual crowns.
- All suppressed and intermediate crown class trees would be removed.
- Only trees less than 30 inches dbh would be selected for removal unless they present a safety hazard (USDA 2012).
- Hardwoods 12 inches dbh or larger would be retained unless removal facilitates treatment efficacy and/or safety.
- No snags would be retained. Snag retention adjacent to the fuelbreak would be consistent with the prescriptions for the applicable treatment emphasis area adjacent to the fuelbreak.

Plantations

Approximately 1,209 acres of the project area were previously harvested and replanted as plantations. The full range of treatment activities, except for salvage treatments, would occur in plantations to accelerate the development of key habitat and old forest characteristics, increase stand heterogeneity, promote hardwoods, and reduce risk of loss to wildland fire. Specific treatment activities include:

- Dominant and codominant coniferous trees less than 20 inches DBH with large crown ratios would be thinned to 100 to 150 trees per acre with an average spacing of 20 feet between the driplines of residual crowns. The tallest, straightest, and healthiest dominant trees would be retained.
- Surface fuel load would be removed through mastication or prescribed burning to achieve a density of materials 3 inches and smaller at less than 5 tons per acre, and less than 0.5 feet deep.
- Shrubs would be removed to achieve less than 50 percent of the surface area containing live shrubs.
- All snags greater than 6 inches dbh would be removed
- Trees with evidence of mistletoe would be prioritized for removal, while healthy sugar pine and Douglas fir would be prioritized for retention.
- Treatments would release black oaks greater than 12 inches dbh and healthy sugar pine greater than 24 inches dbh from competition with other conifers. To achieve this, conifers up to 20 inches dbh within 20 feet of the dripline of a black oak or sugar pine would be removed.
- Hardwoods greater than 12 inches dbh and conifers 20 inches dbh or greater would be retained unless they pose a safety hazard.
- Stumps of cut tree species that are susceptible to Annosus root disease may be treated with a borax-based fungicide to minimize the spread of root disease. Treatments would be limited to areas near recreation sites, trail heads or other high use recreation areas.

Aspen Stands and Meadows

Approximately 193 acres of the project area contain aspen stands and meadows, which have been degraded by conifer encroachment. The full range of treatment activities could occur within the Aspen Stands and Meadows Treatment Emphasis Area to remove encroaching conifers and promote a diverse age class of hardwood trees and meadow obligate species, while avoiding damage to culturally significant aspen stands and individual trees, such as those with historical carvings. All mechanical equipment would operate outside of meadows and special aquatic feature exclusion zones. Specific treatment actions would include:

- All conifers less than 30 inches dbh from within 1.5 tree lengths (approximately 100 feet) of aspen stands and meadow edges (outside special aquatic feature boundaries) would be removed.
- Within 50 feet of aspen stands (a minimum of three aspen stems of 6" or greater dbh in general proximity), conifers 30 to 40 inches dbh may be removed where conifer basal area exceeds 120 square feet per acre, retaining at least 3 trees greater than 30 inches dbh per acre.
- Stumps of cut tree species that are susceptible to Annosus root disease may be treated with a borax-based fungicide to minimize the spread of root disease. Treatments would be limited to areas near recreation sites, trail heads or other high use recreation areas.
- The largest existing snags will be retained to achieve an average of four snags per acre greater than 15 inches dbh across the treatment emphasis area. Retained snags would be clumped and distributed irregularly across the HRCA.
- Monitor aspen regeneration after conifer removal. If monitoring results indicate herbivory is limiting aspen recruitment, temporary enclosures may be erected around aspen stands.

Potential Changes in Canopy Cover

Table 2-3 depicts the community composition, existing canopy cover, canopy cover target, and potential change in canopy cover for the General Forest, California spotted owl HRCA, and California spotted owl and northern goshawk PAC Treatment Emphasis Areas.

Table 2-3 Targeted Changes in Canopy Cover within the General Forest, HRCA, and PAC Treatment Emphasis Areas Outside of the WUI

Treatment Emphasis Area	Community Composition	Existing Canopy Cover (%)[1]	Canopy Cover Target (%)[2]	Potential Decrease in Canopy Cover (%)[3]
General Forest	Mature Jeffrey Pine	40–59	40	0–19
		60–100	40	0–30
	Jeffrey Pine	10–39	40	0
		40–100	40	0–30
	Mature Lodgepole Pine	40–59	40	0–19
	Lodgepole Pine	60–100	40	0–30
	Montane Hardwood-Conifer	10–39	40	0
	Ponderosa Pine	25–39	40	0
	Mature Red Fir	40–59	40	0–19
		60–100	40	0–30
	Red Fir	10–39	40	0
		40–100	40	0–30
	Mature Sierran Mixed Conifer Forest	40–59	40	0–19
		60–100	40	0–30
	Sierran Mixed Conifer	10–39	40	0
		40–100	40	0–30
	Mature White Fir	40–59	40	0–19
		60–100	40	0–30
Home Range Core Areas	Mature Jeffrey Pine	40–59	50	0–9
		60–100	50	0–30
	Jeffrey Pine	10–59	50	0–9
	Montane Hardwood-Conifer	10–39	50	0

Treatment Emphasis Area	Community Composition	Existing Canopy Cover (%)[1]	Canopy Cover Target (%)[2]	Potential Decrease in Canopy Cover (%)[3]
	Mature Red Fir	40–59	50	0–9
		60–100	50	0–30
	Red Fir	10–39	50	0
	Mature Sierran Mixed Conifer Forest	40–59	50	0–9
		60–100	50	0–30
	Sierran Mixed Conifer	10–59	50	0–9
	Mature White Fir	40–59	50	0–9
		60–100	50	0–30
Protected Activity Centers	Mature Jeffrey Pine	40–59	60	0
	Jeffrey Pine	10–39	60	0
	Montane Hardwood-Conifer	25–39	60	0
	Mature Red Fir	40–59	60	0
		60–100	60	0–30
	Red Fir	10–39	60	0
	Mature Sierran Mixed Conifer Forest	40–59	60	0
		60–100	60	0–30
	Sierran Mixed Conifer	10–39	60	0
		40–100	60	0–30
	Mature White Fir	40–59	60	0
		60–100	60	0–30

1. Percentage is based on California Wildlife Habitat Relationship categories: Sparse Cover (10-24% canopy closure), Open Cover (25-39% canopy closure), Moderate Cover (40-59%), DenseCover (60-100%).
2. Within areas that exhibit mature forest conditions before treatment, treatments will reduce canopy cover by no more than 30 percent from existing levels and will maintain a post-treatment canopycover of at least 40 percent throughout the treated areas, excluding fuel breaks.
3. Where existing canopy cover is less than the canopy cover target, only removal of ladder fuels and minimal thinning would occur.
Approximately 3.3 acres of montane riparian habitat are not included in this table because no substantial treatment activities would occur in this habitat.Source: CDFW 2019; Ascent 2019

Treatment Activities

One or more treatment activities would occur within each treatment emphasis area (see Table 2-1 above) to implement the treatments described for each treatment emphasis area. In addition to the treatments described below, approximately seven proven and 10 candidate rust-resistant sugar pine trees within the project area may be treated with "SPLAT" Verbenone, or another similar anti-aggregation pheromone that repels native bark beetles from individual, high-value trees. This pheromone treatment has shown to be effective on a limited, experimental basis (Fetig 2016).

Mechanical Thinning

Mechanical thinning would include ground-based mechanical equipment that employs cut-to-length and/or whole-tree-yarding methods. Equipment that could be used for mechanical thinning include but is not limited to chain saws, harvesters, forwarders, skid steers, excavators, dozers and dozer transport, loaders, tow chippers, track chippers, masticators, feller/buncher, and rubber-tired skidder.

Mechanical thinning treatments would follow a variable density thinning prescription (i.e., thinning to enhance stand structural heterogeneity by deliberately thinning at different intensities within a stand) with the main goal being to reduce stand density and to increase heterogeneity in the treated stands. Such treatments would vary by treatment emphasis area, as described above.

Temporary landings would be established or enlarged during project implementation. The size of the log landings would vary depending on how much debris is generated, but typically average around one-quarter to one-half acre.

Salvage

With salvage treatments, dead and dying trees would be felled and removed using mechanical or hand felling techniques. In addition, hazardous trees of any size that are a threat to private homes, property boundaries, power lines, roads, landings, and other infrastructure—as defined in *Hazard Tree Guidelines for Forest Service Facilities and Roads in the Pacific Southwest Region*—would be felled. Dead or dying trees greater than 12 inches dbh that meet minimum specifications may be sold as sawlogs. Dead or dying trees not meeting sawlog specifications may be cut and removed and sold as biomass, piled, or burned. Salvage treatments would be conducted at the same time as thinning treatments and would generally use similar equipment and methods. Salvage treatments would retain snags as necessary to achieve the average number of snags per acre shown in table 2-2.

Biomass Removal

Biomass treatments would entail the mechanical removal of non-merchantable trees (small trees approximately between 3 and 10 inches dbh). These trees would be removed as firewood, shavings logs, pulpwood, chipped for biomass fuel for electric cogeneration plants, or decked and left on site for future burning or public firewood cutting.

Prescribed Burning

Prescribed burning, also known as broadcast burning or understory burning, would be carried out as a follow-up treatment after mechanical thinning, salvage, and biomass treatments to reduce the density of small trees and brush, reduce surface ladder fuels, and increase canopy height.

Prescribed burning involves the intentional burning of vegetation with the use of hand and aerial ignition techniques during favorable weather conditions. Periodic reentry of prescribed burning would be used to maintain desired conditions.

With prescribed burning, the understory of the forest would be burned using fire with a control line along the perimeter of a treatment site to prevent the unintentional spread of fire beyond the perimeter. Prescribed burning would be conducted under specific conditions related to fuels, weather, and other variables. All prescribed burning would adhere to procedures described in the Interagency Prescribed Fire Planning and Implementation Procedures Guide (NWCG 2017). These procedures address minimum requirements for prescribed fire planning and implementation that address risk management and prioritize public safety.

During review of the annual program of work for Stanislaus National Forest, priority areas would be identified for treatment and follow-up prescribed burn activities. Prior to implementation of prescribed burns, Stanislaus National Forest would follow standardized procedures to develop and execute a burn plan for areas identified for prescribed burn activities (Table 2-4).

Table 2-4 Stanislaus National Forest Prescribed Burn Planning

Prescribed Burn Phase	Actions
Planning	◢ Create a burn plan ◢ Create a smoke management plan and obtain permits from local Air Resources Board ◢ Model predicted fire behavior ◢ Apply for burn plan approval
Prepare Burn Site	◢ Prepare burn area for understory burn ◢ Construct control lines and identify critical holding points ◢ Coordinate with the agency resourced to carry out the burn preparation ◢ Identify sensitive areas and implement measures to protect them
Notification and Approval	◢ Obtain Forest Service regional approval to conduct prescribed burn ◢ Provide public notification
Pre-burn Checklist	◢ Ensure conditions are favorable for burn implementation ◢ Ensure seasonal conditions are within the parameters of burn prescription ◢ Obtain approval to conduct burn from local air quality district ◢ Ensure availability and commitment of resources and contingency resources to conduct prescribed burn ◢ Obtain spot weather forecast from the National Weather Service ◢ Coordinate resources and contingency resources ◢ Ensure that control lines can be used and improve as needed
Day of Prescribed Burn	◢ Conduct resource briefing, tactics, and coordination ◢ Conduct successful test fire ◢ Implement burning techniques throughout the necessary burn periods ◢ Monitor burn for success and local influencing factors ◢ Following successful completion of the burn, conduct mop up and post-burn monitoring ◢ Debrief

Prescribed burning would use patterned lighting techniques and timing of the fires during periods of high humidity and high fuel moisture content, which typically would result in partial removal of understory or groundcover vegetation. The goal of prescribed burning is to conduct a low-intensity burn that only burns the targeted fuel types (i.e., ground and litter fuels). The existing groundcover vegetation would be partially retained in a mosaic pattern in forest and shrub communities. While the amount of vegetation remaining following a prescribed burn varies, up to 70 percent of the vegetation, including overstory vegetation and patchwork of ground cover, typically remains. Fire behavior and burn severity would also depend on the properties of various fuel layers and the horizontal and vertical continuity of those layers (Graham et al. 2010).

Mastication

Mastication involves reducing the size of forest vegetation and downed material by grinding, shredding, chunking, or chopping material. Mastication can effectively reduce fuels created by harvest or be used to remove standing live or dead trees (Graham and Jain 2005).

Mastication would be used to thin small trees (generally, between 1 and 10 inches dbh) and decadent brush to increase the spacing between conifer trees, shred competing vegetation, and maintain tree diversity. Trees with evidence of mistletoe would be prioritized for removal. Healthy sugar pine, Douglas fir, and incense cedar would be prioritized for retention. Healthy oaks would be retained.

Hand Thinning

Treatments would include hand thinning and piling, and chipping. Within PACs outside the WUI snags, brush and small trees less than 6 inches dbh would be thinned. For all other hand treatment areas snags, brush and small trees less than 10 inches would be thinned. In hand thinning operations, a crew would fell trees using chainsaws and limb the log directly at the stump. Through this process, the logs, tree limbs, and slash are either immediately piled into burn piles, chipped or removed from the site.

Access, Hauling, and Road Reconstruction

Access to treatment areas would be provided by the existing network of National Forest Transportation System (NFTS) roads within the project area (Figure 2-3). Road maintenance and reconstruction activities are anticipated to be required along some existing NFTS roads within the project area. Before initiating treatments, roads identified as access routes to treatment units would undergo maintenance activities (e.g., brushing, grading, and maintaining existing road drainage features and runoff patterns) or be reconstructed (e.g., adding new rolling dips or culverts), as necessary. The proposed action would also require the construction of less than a mile of temporary roads to access some of the fuel treatment areas. Temporary roads would be decommissioned and restored after treatment activities, which could include recontouring, decompaction, mulching, and/or reseeding. Design features would incorporate best management practices (BMPs) from the Forest Service Handbook (FSH) for the maintenance, reconstruction, and construction of roads, and would be applied, as appropriate.

Design Features of the Proposed Action

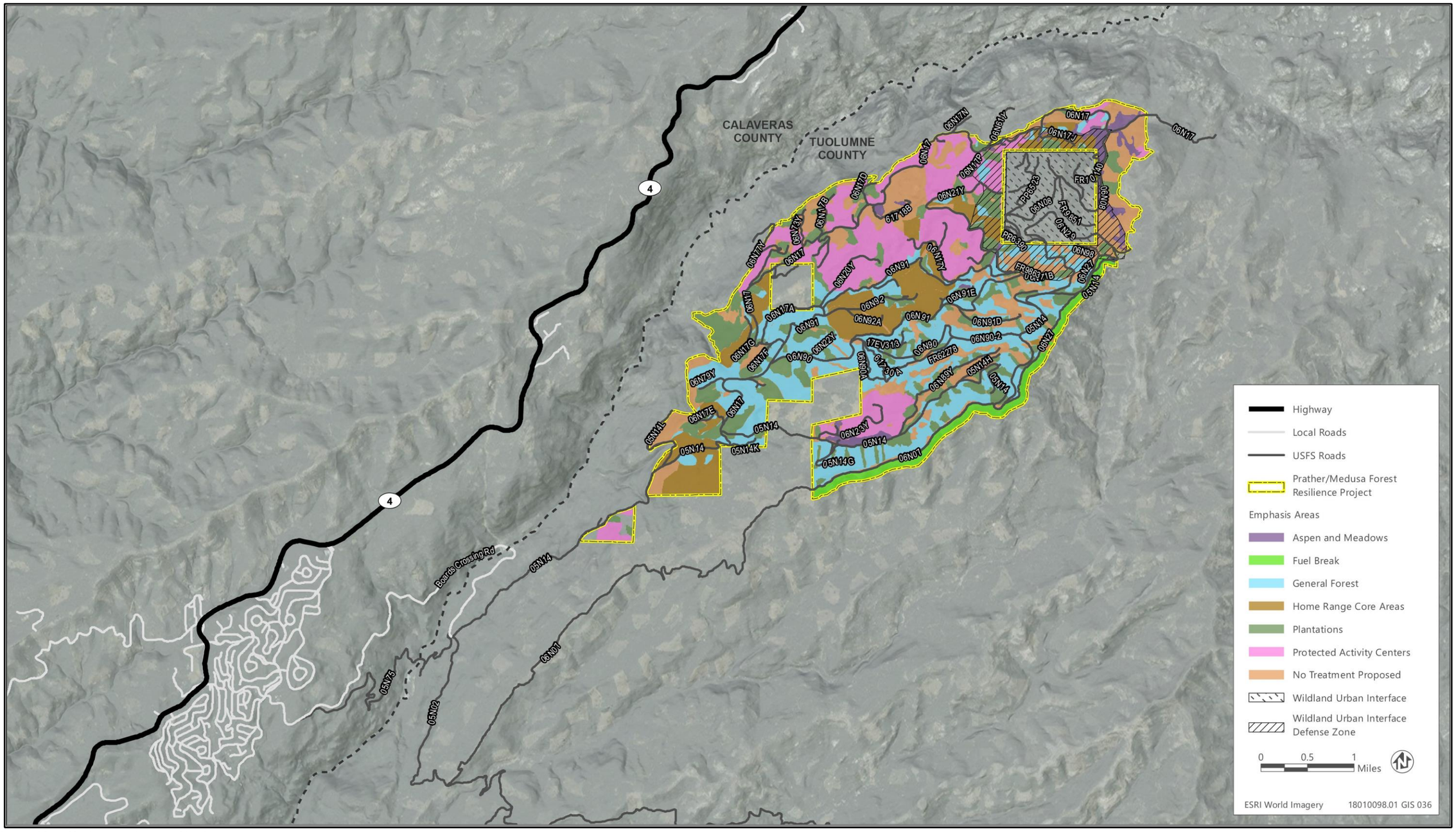
The proposed action includes the mandatory design features described in Appendix A, which are consistent with BMPs identified in the FSH, Standards and Guidelines in the Forest Plan, and site-

specific measures necessary to protect resource values. Because the design features are mandatory elements of the proposed action, this EA analyzes the direct, indirect, and cumulative effects of the proposed action including implementation of the design features.

Alternatives Considered but Eliminated from Detailed Study

NEPA requires federal agencies to evaluate reasonable alternatives and to briefly discuss the reasons for eliminating any alternatives that were not developed in detail (40 CFR 1502.14). The following alternative was considered but eliminated from detailed study because it fails to adequately meet the purpose and need of the project:

- Limit cutting and removal of all trees to 24 inches dbh in HRCAs: This alternative would limit the size of trees that could be removed in California spotted owl HRCAs to 24 inches dbh or less. This alternative was eliminated from study because it does not adequately meet the purpose and need of the project. It would limit the quantity of fuel loads that could be removed from HRCAs and allow dense fuels to persist. In particular, this alternative would not reduce the density of shade-tolerant species to the extent necessary to achieve desired conditions related to forest resilience.



Source: Adapted by Ascent Environmental in 2019

Figure 2-3 Prather Medusa Forest Resilience Project - Access

3. ENVIRONMENTAL CONSEQUENCES

Effects Analysis

This chapter summarizes the existing physical and biological environment of the affected project area and the potential for direct, indirect, and cumulative effects on the environment as a result of implementing the proposed action. This chapter also presents the scientific and analytical basis for a comparison between the two alternatives.

Specialist reports for environmental resources were prepared to support evaluation of potential effects from implementation of the proposed action. The following specialist reports were prepared and are included as a part of the project record:

- Biological Assessment for Aquatic Wildlife
- Biological Evaluation for Sensitive Plant and Wildlife Species
- Hydrology and Wetlands Report
- Cumulative Watershed Effects Assessment
- Invasive Plant Species Risk Assessment

Past, Present, and Reasonably Foreseeable Future Actions

Cumulative effects result from spatial and temporal crowding of multiple environmental perturbations (CEQ 1997). Such effects under NEPA include the total impact on resource areas due to past, present, and reasonably foreseeable future actions of federal and non-federal entities (36 CFR 220.3). The spatial and temporal scale of cumulative effects varies by resource. In evaluating cumulative effects of the proposed action, a variety of potential actions and scales was considered and are described in each resource section of this chapter. Among these is an existing program of restoration activities within a portion of the project area that was evaluated under an environmental assessment (EA) and approved on July 20, 2012 (Prather-Medusa Landscape Restoration Environmental Assessment [30047]; referred to throughout this document as "2012 EA".

3.1. Biological Resources

Introduction

Special-status species evaluated consist of botanical (plants and mosses) and animal species listed under the Endangered Species Act (ESA) as threatened or endangered, species that are proposed or candidate species for listing under the ESA, and plant and animal species listed as Forest Service sensitive by the Pacific Southwest Region (R5) Regional Forester and that are known or have potential to occur on STF. Additionally, program effects related to invasive plant risk, migratory birds, and STF Management Indicator Species (MIS) are analyzed. Federal regulations and policies related to biological resources are also summarized. The effects on waters of the United States are addressed in Section 3.2, "Hydrology."

This analysis is based substantially on information, detailed analysis, and conclusions presented in the following specialist reports prepared for the program:

- Biological Evaluation for Sensitive Plant and Wildlife Species (hereinafter referred to as the "Plant and Wildlife BE") and
- Biological Assessment for Aquatic Wildlife Species (hereinafter referred to as the "Aquatic Wildlife BA")

These documents are hereby incorporated by reference, are part of the project record, and are available for review on the STF website.

Affected Environment

Invasive Plants

A reconnaissance-level biological survey and habitat mapping were completed in October 2019, and invasive species were documented where they were encountered. In addition, invasive plant infestations within the project area were documented during surveys for an unrelated project in 2010 and 2011. During these surveys, infestations of bull thistle (*Cirsium vulgare*) were found scattered through the project area, primarily along roads and in heavily disturbed meadows. Bull thistle is recognized as a noxious weed by the California Department of Food and Agriculture.

The non-native, invasive plants cheatgrass (*Bromus tectorum*) and wooly mullein (*Verbascum thapsus*) are also found in the project area. Mullein was documented in the northern portion of the project area. Cheatgrass has been found along roads and landings. These species are not State or Federal noxious weeds. Cheatgrass and wooly mullein are widespread and naturalized throughout the Forest and will not be further addressed in this analysis.

Special Status Plants

A total of 27 sensitive botanical species are known or could occur in the Prather-Medusa project area. These special-status plant species are listed in Table 3.1-1 and described in detail in the plant and wildlife BE prepared for the Prather-Medusa Forest Resilience Project. No plant species listed under the ESA have potential to occur in the Prather-Medusa project area.

Table 3.1-1 U.S. Forest Service Sensitive Plants with Potential to Occur in the Prather-Medusa Project Area

Common Name	Scientific Name	Status
Three-bracted onion	*Allium tribracteatum*	Sensitive
Yosemite onion	*Allium yosemitense*	Sensitive
Upswept moonwort	*Botrychium ascendens*	Sensitive
Scalloped moonwort	*Botrychium crenulatum*	Sensitive
Common moonwort	*Botrychium lunaria*	Sensitive
Mingan moonwort	*Botrychium minganense*	Sensitive
Western goblin	*Botrychium montanum*	Sensitive
Stalked moonwort	*Botrychium pedunculosum*	Sensitive
Northwestern moonwort	*Botrychium pinnatum*	Sensitive
Bolander's bruchia	*Bruchia bolanderi*	Sensitive
Pleasant Valley mariposa-lily	*Calochortus clavatus* var. *avius*	Sensitive
Small's southern clarkia	*Clarkia australis*	Sensitive
Mountain lady's-slipper	*Cypripedium montanum*	Sensitive
Branched collybia	*Dendrocollybia racemosa*	Sensitive
Yellow-lip pansy monkeyflower	*Diplacus pulchellus*	Sensitive
Jack's wild buckwheat	*Eriogonum luteolum* var. *saltuarium*	Sensitive
Congdon's woolly sunflower	*Eriophyllum congdonii*	Sensitive
Yosemite woolly sunflower	*Eriophyllum nubigenum*	Sensitive
Slender-stemmed monkeyflower	*Erythranthe filicaulis*	Sensitive
Brook pocket moss	*Fissidens aphelotaxifolius*	Sensitive
Short-leaved hulsea	*Hulsea brevifolia*	Sensitive
Congdon's lewisia	*Lewisia congdonii*	Sensitive
Hutchison's lewisia	*Lewisia kelloggii* ssp. *hutchisonii*	Sensitive
Kellogg's lewisia	*Lewisia kelloggii* ssp. *kelloggii*	Sensitive
Stebbins' lomatium	*Lomatium stebbinsii*	Sensitive
Broad-nerved hump moss	*Meesia uliginosa*	Sensitive
Western waterfan lichen	*Peltigera gowardii*	Sensitive

Source: CNDDB 2019; USDA 2013a; USFWS 2019

Special-Status Aquatic and Terrestrial Wildlife

Two federally listed threatened or endangered and 10 sensitive wildlife species are known or could occur in the project area and may be affected by project implementation. These special-status aquatic and terrestrial wildlife species are listed in Table 3.1-2 and described in detail in the Plant and Wildlife BE and Aquatic Wildlife BA for the Prather-Medusa Forest Resilience Project.

Table 3.1-2 Threatened, Endangered, and Sensitive Aquatic and Terrestrial Wildlife Species with Potential to Occur in the Prather-Medusa Project Area

Common Name	Scientific Name	Status
Birds		
California spotted owl	*Strix occidentalis*	Sensitive
Great gray owl	*Strix nebulosa*	Sensitive
Northern goshawk	*Accipiter gentilis*	Sensitive
Amphibians		
Foothill yellow-legged frog	*Rana boylii*	Sensitive
Sierra Nevada yellow-legged frog	*Rana sierrae*	Endangered
Yosemite toad	*Anaxyrus canorus*	Threatened
Reptiles		
Western pond turtle	*Actinemys marmorata*	Sensitive
Mammals		
Fringed myotis	*Myotis thysanodes*	Sensitive
Pacific marten	*Martes caurina*	Sensitive
Pallid bat	*Antrozous pallidus*	Sensitive
Sierra Nevada red fox	*Vulpes necator*	Candidate
Townsend's big-eared bat	*Corynorhinus townsendii*	Sensitive

Source: CNDDB 2019; Holland pers. comm., 2019; USDA 2013b; USFWS 2019

Several additional special-status animal species were initially considered for analysis. However, these species were not evaluated further because: 1) the project area is outside the known range of the species, 2) the species is not known or expected to occur in STF, 3) proposed treatments would not be implemented in occupied or suitable habitats for these species, or 4) the proposed action would not affect the species for other reasons. These species, their regulatory status and habitat associations, and brief rationales for eliminating them from further evaluation are described in the Plant and Wildlife BE and the Aquatic Wildlife BA.

Environmental Consequences

Invasive Plants

Direct and Indirect Effects

Invasive plants have a competitive advantage because of a lack of natural predators, and can therefore quickly spread across landscapes, crowding out natural species and altering ecosystem processes. Riparian invasive plant species are especially harmful because streams act as a vector to seed transport and can rapidly promulgate invasive species. After wildfires, non-native plant species typically re-establish more rapidly than native plants, suppressing the recovery of the native vegetation and allowing the invasive plants to expand their range.

Mechanical thinning, salvage operations, and biomass removal would create ground disturbance through the use of heavy equipment. Skid trails may result in additional ground disturbance. Hand thinning and mastication activities would create less ground disturbance comparatively. Because most invasive species are adapted to tolerate disturbance more easily than many native species, this ground disturbance provides an avenue for the establishment or spread of invasive species. Prescribed fire could temporarily remove the forest understory and consume forest litter, which would expose areas of bare mineral soil where invasive species could become established. Overall, the proposed forest resilience activities would generally result in a more open canopy so that more light would reach the forest floor. This would encourage the growth of many native species typical of forest openings but would also encourage the expansion of invasive species infestations.

Vegetation treatment activities would also result in an increase in the number of vehicles moving to and from the project area. Road maintenance vehicles would access project area before forest resilience activities to provide access for heavy equipment. Heavy equipment and trucks would be transported from unknown locations and brought to the project area for mechanical treatments and hauling of sawlogs and biomass. Additionally, vehicles would be needed to transport crew members to and from the work site during treatment activities. Each new vehicle or machine that is brought into the project area could act as a vector for invasive species seeds or plant materials. Vehicles or equipment that have not been cleaned before arriving at the project area may carry in new species, and equipment working in an existing infestation within the project area could spread seeds and plant materials. Additionally, project workers could introduce or spread seeds attached to clothing or lodged in shoes.

The proposed action would result in greater ground disturbance and therefore a higher potential for invasive plant spread than not taking any action. Existing infestations of invasive plants coupled with soil disturbance that could occur during implementation create moderate to high risk conditions for invasive plant spread. The potential for introduction or spread of invasive plants was reduced by standard design features (BIO-2 and BIO-5), which include surveys for invasive plant species before project implementation, cleaning of equipment to remove seeds and propagules, use of weed free materials and equipment, and the possibility of treatment of known infestation before project activities. Overall, with implementation of these design features, the program would have a moderate risk of introduction or spread of invasive plants.

Cumulative Effects

The cumulative effects from project-created vectors and existing vectors in the area (such as recreational and rangeland uses) would be a moderate increase in the risk of introduction or spread of invasive plant species relative to not implementing the proposed action. As infestations are treated, future spread from all vectors would be indirectly reduced.

Special-Status Plants

Direct and Indirect Effects

Direct impacts to special-status plants that could result from implementing the proposed action include death, altered growth, or reduced seed set through physically breaking, crushing, burning, scorching, trampling, or uprooting plants during treatment activities. Treatment activities could also alter growth and reproduction of sensitive plants through habitat modifications. Indirect beneficial effects could result from the elimination of competition from invasive plants or

improved habitat quality or ecosystem function related to vegetation thinning that reduces competition for limited resources. However, treatment actions could result in removal of overstory vegetation, which could alter microhabitat conditions adversely for sensitive plants if they are adapted to growing in shade or if the loss of overstory vegetation results in adverse changes in soil moisture; light intensity, timing, and duration; and temperature; or if loss of vegetative cover destabilizes soil, resulting in erosion that limits sensitive plant establishment and growth or washes away sensitive plants or their seeds with eroding soil.

Design features would be implemented as part of the proposed action to minimize or avoid direct and indirect impacts on sensitive plant species including prohibition of staging in riparian habitats or areas occupied by sensitive plants, protocol-level sensitive plant surveys, and implementing protective measures to flag and avoid sensitive plant occurrences. Several of the sensitive plant species known or with potential to occur in the project area, including the *Botrychium* species, are associated with Special Aquatic Features (e.g., lakes, meadows, fens, wetlands, seeps, and springs), and these habitats would be protected through implementation of several design features including Riparian Conservation Area (RCA) Operating and Equipment Specifications and RCA exclusion zones. *Allium tribracteatum* and *Lomatium stebbinsii* are found on open, volcanic soils near ridgetops (lava caps). Per design features, no treatments or mechanical operations would occur on lava caps or rock outcrops unless surveys confirm that sensitive plants are not present. By comparison to not implementing the proposed action, project activities could result in direct disturbance-related effects and indirect species competition-related effects; however, with implementation of the design features sensitive plants would be minimized and loss of sensitive plant occurrences would be avoided such that direct and indirect effects on sensitive plants would be reduced to a negligible level.

Cumulative Effects

Because the direct and indirect impacts of the proposed action (including design features) are expected to occur at a negligible level, the proposed action's contributions to cumulative impacts would be minimal.

Summary

As determined in the Plant and Wildlife BE, the proposed action may affect individuals but is not likely to contribute to the need for federal listing or result in loss of viability of the 27 sensitive plant species that are known or have potential to occur in the project area.

Special-Status Aquatic and Terrestrial Wildlife

Direct, Indirect, and Cumulative Effects

Federally Listed Species

As discussed in the Aquatic Wildlife BA, the Prather-Medusa project area lacks optimal habitat for Sierra Nevada yellow-legged frog and Yosemite toad, and there have been no documented occurrences in the project area. Implementation of design features would reduce the risk of adverse effects on Sierra Nevada yellow-legged frog and Yosemite toad as a result of the proposed action. However, there is some uncertainty regarding the likelihood of Sierra Nevada yellow-legged frog and Yosemite toad to use the project area for breeding or movement because of the presence of potential habitat in the project area and regional connectivity to suitable and/or occupied habitats

outside the project area. These factors, combined with the high level of vulnerability and severe population declines of these species across their ranges, and the existence of the USFWS *Programmatic Biological Opinion (BO) on Nine Forest Programs on Nine National Forests in the Sierra Nevada of California for the Endangered Sierra Nevada Yellow-legged Frog, Endangered Northern Distinct Population Segment of the Mountain Yellow-legged Frog, and Threatened Yosemite Toad* has led STF to determine that the proposed action may affect individuals or habitat and is likely to adversely affect Sierra Nevada yellow-legged frog or Yosemite toad.

Sensitive Species

Direct, indirect, and cumulative effects of the proposed action on the following 10 Forest Service sensitive species are analyzed and described in detail in the Plant and Wildlife BE, which is hereby incorporated by reference.

- California spotted owl
- Great gray owl
- Northern goshawk
- Foothill yellow-legged frog
- Western pond turtle
- Fringed myotis
- Pacific marten
- Pallid bat
- Sierra Nevada red fox
- Townsend's big-eared bat

The potential direct and indirect effects of the proposed action vary by species and generally would include: short-term disturbances to individuals, breeding or roost sites, and suitable habitat as a result of site preparation, access, and treatment activities; long-term habitat alteration that may include loss of large, mature trees and reduction in canopy cover; and long-term improvements to habitat quality for some sensitive species as a result of increased spatial heterogeneity both vertically and horizontally within the general forest condition category. As described in the Plant and Wildlife BE, potential adverse effects on sensitive wildlife species would be reduced to negligible levels through implementation of the design features. By contrast, if no action is taken, there is a reasonable likelihood that forest processes and functions will be degraded due to a continued increase in fuels, conifer encroachment into riparian, meadow, and aspen communities, insect and disease infestations and high intensity wildfires. Each of these stressors currently occurring within the project area may cause habitat alteration and fragmentation. If habitat is altered or lost there is a higher likelihood that the reproductive success and persistence for sensitive and federally listed wildlife species would be reduced.

As determined in the Plant and Wildlife BE, the proposed action may affect individuals but is not likely to contribute to the need for federal listing or result in loss of viability for Sierra Nevada red fox, and may affect individuals but is not likely to result in a trend toward federal listing or loss of viability for the remaining nine U.S. Forest Service sensitive species analyzed. This determination is based on the following rationale:

- The current range of Sierra Nevada red fox is extremely restricted, and the species is not likely to occur within the project area. If individuals were to transit through the project area, it would likely be during the winter when the species is known to move to lower elevation areas. Most treatment activities would not occur during the winter.
- Before implementation of treatment activities within suitable habitat and during the breeding seasons for California spotted owl and northern goshawk, protocol surveys for these species would be conducted within suitable habitat, and if spotted owls, nests, roosts, or territories are

detected, species-specific design features will be applied (e.g., Protected Activity Centers [PACs], Home Range Core Areas [HRCAs], Limited Operating Periods [LOPs]).

- LOPs would be implemented within 0.25 mile of California spotted owl PACs and northern goshawk PACs during the active nesting season for these species. These LOPs would provide protection for the species targeted and would also provide indirect protection for Pacific marten and great gray owl, which may den or nest within these habitats during the LOP.
- Mechanical treatments would be prohibited within a 500-foot radius of a California spotted owl activity center within a designated PAC, as identified during protocol-level surveys. Treatment activities in these areas would be limited to prescribed fire and hand treatments prior to prescribed fire, as needed to protect important elements of California spotted owl habitat structure.
- RCAs would be established within 300 feet of perennial streams and other Special Aquatic Features, and within 150 feet of intermittent and ephemeral streams, where foothill yellow-legged frog and western pond turtle may occur. Activities within these RCAs would follow Operating and Equipment Specifications, which are designed to reduce soil erosion, vegetation loss, and water quality impacts.
- Suitable habitat for U.S. Forest Service sensitive wildlife species would not be substantially reduced because treatment activities would be limited within PACs and HRCAs to retain suitable canopy cover percentages for California spotted owl and northern goshawk (and indirectly for great gray owl and Pacific marten). Treatment activities within mature forest habitats are also designed to preserve mature forest conditions.
- Post-treatment conditions within mature forest habitats retain canopy cover of at least 40–60 percent and would also retain mature forest characteristics that would likely be used by bats (e.g., large trees, snags), and because implementation of design features would result in avoidance or reduction of impacts on fringed myotis, pallid bat, and Townsend's big-eared bat.

Migratory Birds

Because the proposed action would include design features to minimize or avoid short-term disturbances to bird species and habitats, and because habitat quality for some migratory bird species may improve overall as a result of treatments relative to existing conditions, project implementation would not substantially adversely affect migratory birds and a separate detailed specialist report for this analysis was not prepared.

Management Indicator Species

The 13 Management Indicator Species (MIS) and their habitat potentially impacted by the proposed action were reviewed and placed into three categories based on proximity of MIS habitats to the project area and likelihood of effects related to implementation of treatments on the habitats (Table 3.1-3). Two MIS – California spotted owl and Pacific marten – are analyzed in detail in "Sensitive Species," above.

Table 3.1-3 Management Indicator Species for Project Analysis

Species	Indicators of Management	No habitat in or adjacent to the project area, thus not affected directly or indirectly by the project	Habitat in or adjacent to the project area, but not affected directly or indirectly by the project	Habitat would be affected directly or indirectly by the project
Aquatic macroinvertebrates	Riverine and lacustrine.			X
Fox sparrow *Passerella iliaca*	Shrubland (west-slope chaparral types).			X
Mule deer *Odocoileus hemionus*	Oak-associated hardwood and hardwood/conifer.			X
Yellow warbler *Dendroica petechia*	Riparian.			X
Sierran tree frog *Psuedacris sierra*	Wet Meadow.			X
Mountain quail *Oreortyx pictus*	Early and mid seral coniferous forest.			X
Sooty grouse *Dendragapus fuliginosus*	Mature forest open canopy coniferous forest.			X
California spotted owl	Mature forest closed canopy coniferous forest.			X
Pacific marten	Mature forest closed canopy coniferous forest.			X
Northern flying squirrel *Glaucomys sabrinus*	Mature forest closed canopy coniferous forest.			X
Hairy woodpecker *Picoides villosus*	Snags in green forest.			X
Black-backed woodpecker *Picoides arcticus*	Snags in burned forest.	X		

Because the proposed treatment activities in the proposed action would not result in conversion, permanent disturbance, or degradation of any land cover type or MIS habitat, a separate MIS report was not prepared. MIS reports typically consider several factors in evaluating project- or program-level effects on MIS habitats, including population and habitats trends of MIS, MIS monitoring summaries, and other details. These factors were considered but not discussed individually in this analysis.

3.2. Hydrology

Affected Environment

The project area is in the North Fork Stanislaus River watershed, one of the four major rivers on the Stanislaus National Forest. The North Fork Stanislaus River forms the border between Tuolumne and Calaveras counties. Within the Stanislaus River drainage, the project is located in the North Fork Stanislaus and Highland Creek subwatersheds. Highland Creek is a tributary to the North Fork Stanislaus River. Watersheds for the project are delineated using the hydrologic unit code (HUC) system, a nested hierarchical approach for classifying and naming watersheds based on size and location (USGS and NRCS 2009).

The entire project area drains west and northward into the Middle North Fork Stanislaus River. It encompasses the drainage area for seven HUC 7 watersheds, based on the National Hydrologic Dataset (NHD). Those watersheds are the Whittles Upper Camp, Ganns, Hell's Kitchen, Boards Crossing, Lower Highland Creek, Upper Beaver Creek, and Middle Beaver Creek drainages (Figure 3.2-1). Prominent riparian and aquatic features of the watersheds that drain the project area are described below and shown in Figure 3.2-2.

The most recent stream condition survey for watershed streams within the project area was conducted in 2009. This survey followed the Stanislaus Streamscape Inventory (SSI) protocol (Frazier et. al. 2008) for stream morphology, condition, and health indicators. SSI is a field-intensive methodology for evaluating the existing condition of stream channels, aquatic resources, and riparian areas.

Stream conditions for all watersheds within the project area were found to be generally good during the 2009 SSI inventory. However, some areas of concern due to management activities were observed within project watersheds. Past and present livestock grazing activities tend to be focused in meadow and riparian areas with high moisture content, which has resulted in trampling of native plants, loss of meadow biodiversity, and compaction of soils in meadow and riparian systems within the project area. Forest Service current management practices aim at reducing the amount of time livestock are present in riparian areas, and in those areas where it has been substantially reduced, there has been some improvement in vegetation and moisture conditions.

North Fork Stanislaus River

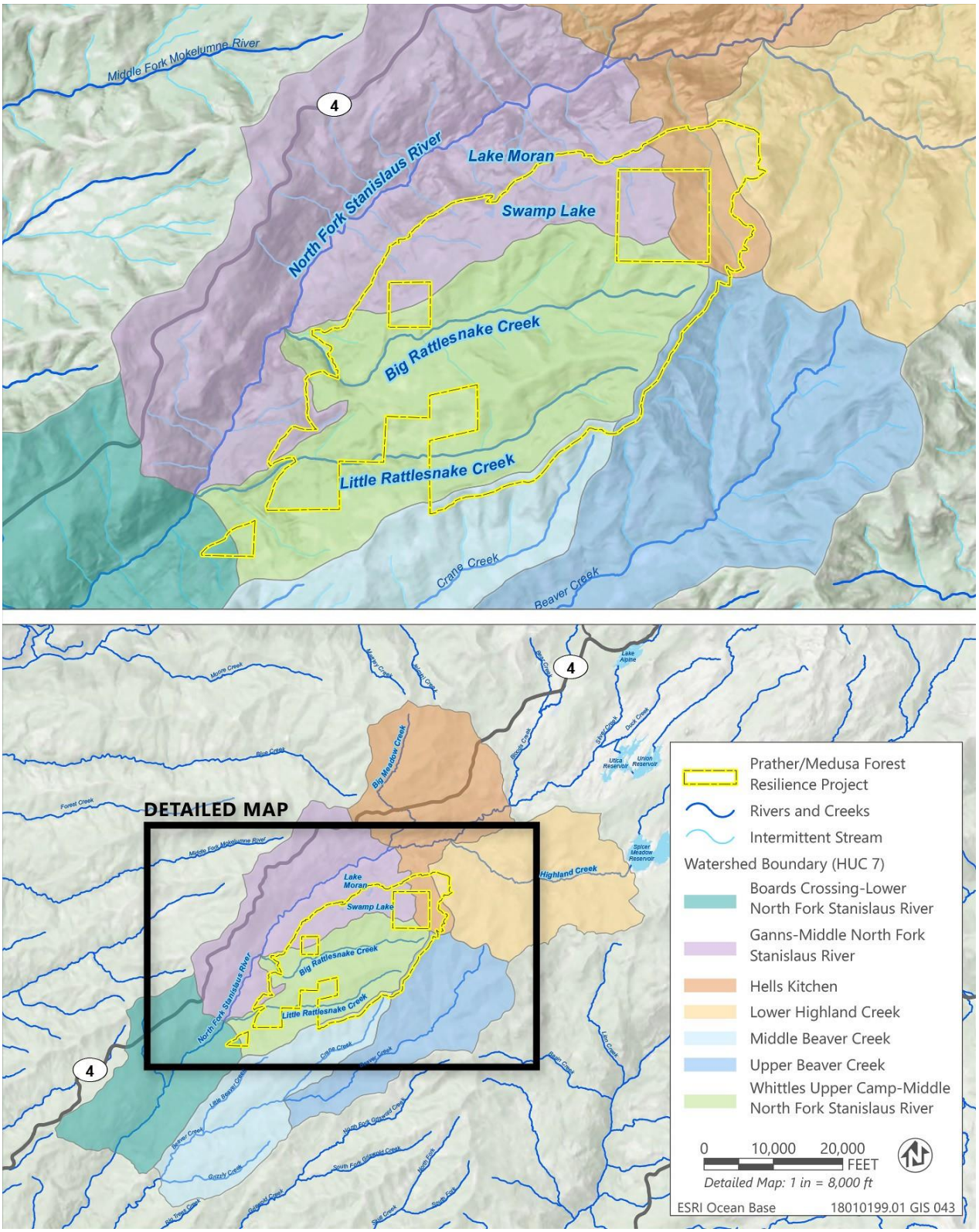
The North Fork Stanislaus River is a 31.2-mile tributary of the Stanislaus River in the central Sierra Nevada mountains and Stanislaus National Forest of eastern California. It drains approximately 196 square miles, and flows to the north of the project area, from east to west. The North Fork Stanislaus River has been identified in the Forest Plan as a proposed Wild and Scenic River along the reach that bypasses and drains the project area. Proposed Wild and Scenic Rivers and their immediate environments are managed by the U.S. Forest Service to preserve their free flowing (unimpounded) condition, and protect outstandingly remarkable values, including beneficial uses (see Table 3.2-1). The portion of the North Fork Stanislaus River that drains the project area and is proposed as a Wild and Scenic River is the 16 miles from Highland Creek to McKays Reservoir. This area includes two eligible segments—13 miles identified classified as Wild and 3 miles classified as Recreation and includes all lands within 1/4 mile of each segment.

The North Fork Stanislaus River is a HUC 6 watershed; because of the relatively large size of North Fork Stanislaus River, the small number of treatment acres, and the position of the project high in the upper watershed, adverse effects to the North Fork Stanislaus River as a result of project activities are expected to be minor.

Table 3.2-1 Designated Beneficial Uses for the Stanislaus River, Including the North Fork Stanislaus River

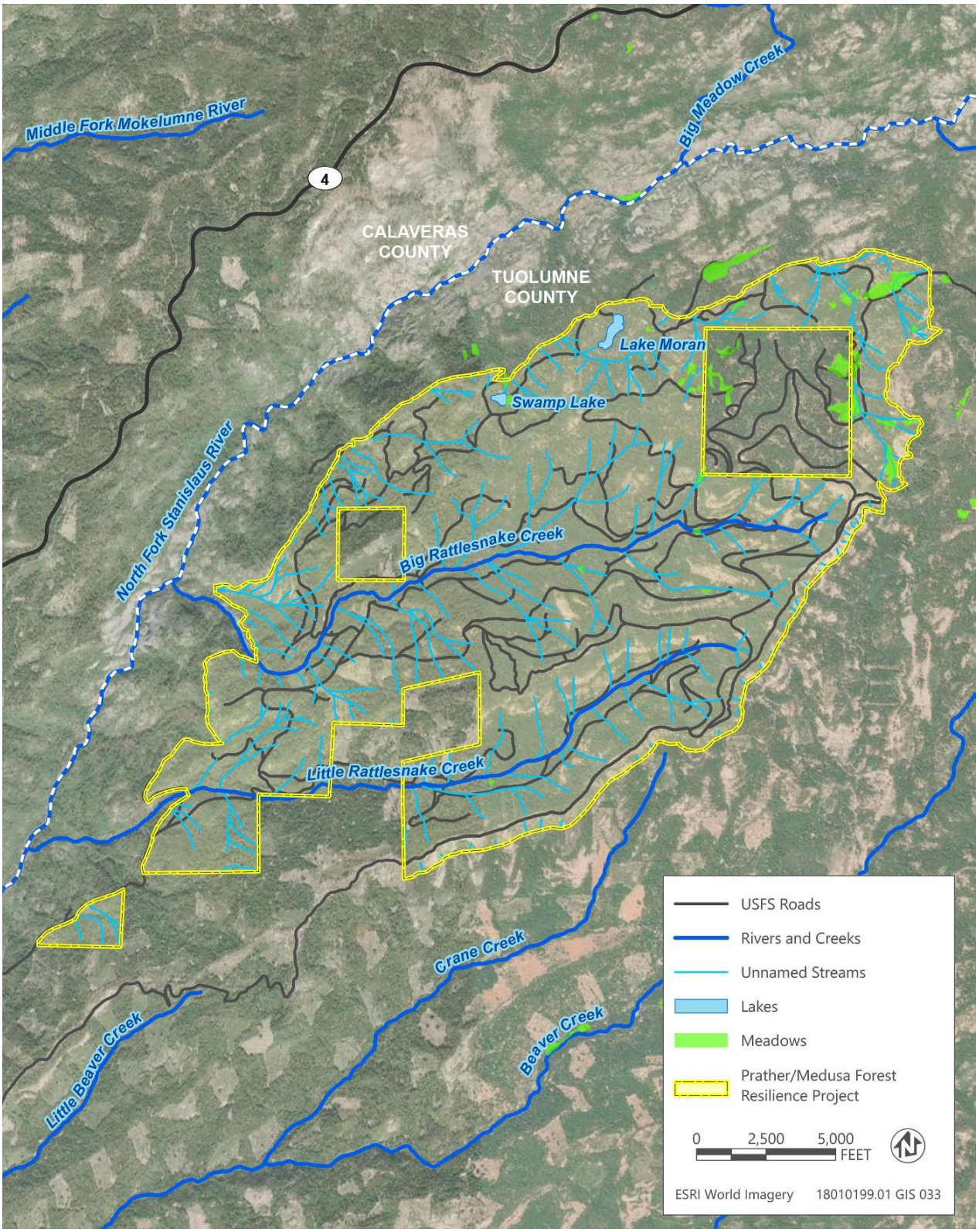
Beneficial Use	Definition of Use	Stanislaus River – Source to New Melones Reservoir
Surface Water		
Municipal and Domestic Supply	Community, military, or individual water supply, including drinking water supply.	X
Agricultural Supply	Irrigation.	X
	Stock watering.	X
Industry	Hydropower Generation. Hydroelectric power generation.	X
Recreation	Contact Recreation. Recreational activities involving body contact with water where ingestion of water is reasonably possible. These include, for example, swimming, water-skiing, or fishing.	X
	Canoeing and Rafting. Recreational activities involving proximity to water, but not normally involving body contact with water. These uses include picnicking, sunbathing, hiking, beachcombing, camping, boating, and others.	X
	Other Noncontact Recreation. Recreational activities involving proximity to water, but not normally involving body contact with water. These uses include picnicking, sunbathing, hiking, beachcombing, camping, boating, and others.	X
Freshwater Habitat	Coldwater Habitat. Beneficial uses of waters that support cold water ecosystems including, but not limited to, preservation and enhancement of aquatic habitats, vegetation, fish, and wildlife, including invertebrates.	X
	Warm Water Habitat. Beneficial uses of waters that support cold water ecosystems including, but not limited to, preservation and enhancement of aquatic habitats, vegetation, fish, and wildlife, including invertebrates.	X
Warmwater Spawning, Reproduction, and Development	Uses of water that support high quality aquatic habitat necessary for reproduction and early development of fish and wildlife.	X
Wildlife Habitat	Uses of waters that support wildlife habitat including preservation and enhancement of vegetation and prey species such as waterfowl.	X

Source: Central Valley RWQCB 2018



Source: Adapted by Ascent Environmental in 2019

Figure 3.2-1 Watershed Boundary – Prather Medusa Forest Resilience Project



Source: Data received from Forest Service in 2019

Figure 3.2-2 Hydrology – Prather Medusa Forest Resilience Project

Whittles Upper Camp Watershed

Most of the project area—74 percent—lies within the Whittles Upper Camp watershed, drained by two creeks, Big Rattlesnake and Little Rattlesnake Creeks (Figure 3.2-2). These creeks generally flow in a westerly direction and are fed by lesser intermittent and perennial drainages. The most recent stream condition survey was conducted in 2009 on portions of Big Rattlesnake Creek. Approximately 7,100 meters of Big Rattlesnake Creek was surveyed, from the bridge on FSTS road 6N17 to the upstream crossing at 6N08.

The largest drainage in the project area, Big Rattlesnake Creek is in overall good stream health. There is some channel instability along various reaches within the project area; however, streambank stability is high along more than half of the creek reach, and moderate along approximately 35 percent of the reach. In 2013, a culvert along FSTS road 6N91 that had been a source of stream downcutting in Big Rattlesnake Creek was decommissioned in effort to reduce some of the downstream channel instability.

Stream shading along Big Rattlesnake Creek is high, measuring between 60 and 92 percent U.S. Department of Agriculture Forest Service (USDA 2009) and adequate to maintain cool water temperatures (ranging between 10 and 15 degrees Celsius). During the 2009 SSI survey, rainbow trout of diverse sizes and age classes were observed, which indicates that the stream habitat is acceptable for fish spawning and rearing. Obligate riparian vegetation is sparse along most reaches, consisting primarily of alder, with isolated groups or individuals of dogwood, cottonwood, and aspen of various age classes. Non-obligate riparian vegetation is more abundant and is dominated by light to moderately dense stands of white fir, mixed conifer, red fir, and a small amount of lodgepole pine of various age classes.

Little Rattlesnake Creek is in moderate stream health and appears to have been heavily modified from management activities in the surrounding watershed. Because of this, the channel has a high degree of channel instability, with incised and widened portions along significant portions of the stream. Sufficient stream shading along Little Rattlesnake Creek keeps water temperatures cool, and other physical indicators such as stream pool distribution, substrate size, and downed woody debris supply a quality of stream habitat sufficient to support an abundance of fish species of various age classes (USDA 2012). Obligate riparian vegetation occurs in greater densities than along Big Rattlesnake Creek, with montane riparian and aspen land cover classes along significant portions of the creek in the south-central part of the project area. Non-obligate riparian vegetation along the creek is characterized by Sierran mixed conifer, Jeffrey pine, and red fir, consistent with the general forest condition class within the project area.

There are 10 dispersed recreation sites along Big Rattlesnake Creek, and three dispersed recreation sites along Little Rattlesnake Creek. These sites are exhibiting signs of resource damage to various degrees, because of erosion and sedimentation, riparian disturbance, and lack of sanitation.

Ganns Watershed

Approximately 13.5 percent of the project area drains into the Ganns HUC 7 watershed. Within the project area, this watershed is drained by minor tributaries to the North Fork Stanislaus River. Lake Moran and Swamp Lake are two perennial lacustrine features of this watershed, located at the headwaters of these tributaries.

Lake Moran is a popular destination for dispersed camping and off-highway vehicle use. The rocky, densely treed shoreline is stable and shows little evidence of disturbance by humans or

livestock. The lake is 11 acres in size and currently hydrologically functional; however, there is evidence of off-highway vehicle use around the lake shoreline that presents the potential for resource damage. A 0.2-acre compacted parking and camping area adjacent to the shore is hydrologically connected to the lake, but large woody debris and live vegetation along the shore are function as an effective sediment filter for flow to the lake. In 2013, an unauthorized lake access spur road to Lake Moran within the Inventoried Roadless Area was blocked with barriers to keep vehicles from the shoreline and prohibit access to unauthorized off-highway vehicle routes.

Swamp Lake consists of a shallow pond and surrounding wet meadow dominated by dense herbaceous vegetation. During the grazing season, Swamp Lake is fenced, keeping hydraulic function in good working condition. A non-NFTS spur road and dispersed campsite near the northeastern edge of the meadow is hydrologically connected but delivers only small amounts of runoff and sediment to the meadow because runoff is readily filtered by the dense vegetation and low gradient. The 2012 EA and DN approved measures to restrict vehicular access to the non-NFTS road through the placement of boulders, logs, or other barriers, but these actions have not been carried out.

Big Prather Meadow Watershed

Big Prather Meadow Creek is generally in good stream health. The channel form does not show signs of active downcutting or accelerated incision and shows good equilibration and stabilization. Like many riparian and aquatic features within the project area, the creek form is stabilizing following a history of instability likely caused by past management activities in the area. The stream is moderately shaded, providing enough cover to maintain cool water temperatures (between 9 and 15 degrees Celsius; USDA 2012). The geomorphology and physical characteristics of Big Prather Meadow Creek suggest that the stream habitat is of sufficient quality to support fisheries; however, no fish or other aquatic fauna were observed during the 2009 SSI survey (USDA 2012).

Slopes adjacent to the stream channel support some riparian aspen and willow obligate vegetation; however, the riparian environment is dominated by non-obligate riparian vegetation. Age classes of aspen are generally mature, and densities are sparse to light, while age classes for willow are diverse and densities sparse. Non-obligate riparian vegetation is characterized primarily stands of mixed conifer and red fir, typical of the general forest condition class within the project area. Age classes for non-obligate riparian vegetation are diverse and densities range from light to moderate.

Wetlands

Wetland habitats, including fresh emergent wetlands and wet meadows, are limited in extent. Big Prather meadow is the most substantial wetland feature—approximately 15 acres in size—within the 7,132-acre project area. It is located in the Big Prather Meadow HUC 8 watershed. Most of the meadow is located on a private inholding within the project site and is therefore not accessible for direct observation. However, hydrologic function of the meadow appears to be good based on water quality and stream condition data collected upstream and downstream of the meadow (USDA 2012). The Big Prather Meadow HUC 8 watershed is also the location of Segales and Little Prather Meadows. Segales Meadow is located alongside NFTS road 6N17 where road drainage has caused gullying and incision into the meadow. Easy motor vehicle access from this road has also created substantial damage. Segales Meadow is also under threat from downstream channel incision that could migrate upstream, which would lower the water table and drain the meadow. Little Prather Meadow is adjacent to and outside of the project area.

Three fen/spring complexes within the Whittles Upper Camp watershed in the south-central portion of the watershed were evaluated by an interdisciplinary team in November 2010 using the Proper Functioning Conditions survey protocol for lentic areas and fens (USDI 2003; Weixelman and Cooper 2009). Conditions at all three features were evaluated and determined to be "functional-at-risk," due primarily to hydrologic alteration from extensive pocking and trailing generated by livestock grazing. In 2016, exclusion fencing was implemented around these features to protect them from livestock grazing. A fourth spring/wet meadow aquatic feature near FSTS road 5N14H, exhibiting extensive cattle pocking, was identified during the November 2010 survey. During the 2009 survey, this wetland was noted to have the early stages of channel formation and groundwater loss because of pocking from cattle grazing.

Environmental Consequences

Direct and Indirect Effects

Vegetation Management

Activities related to the proposed action for the treatment of forest fuels and commercial timber harvest such as mechanical harvesting, log skidding, mastication, and biomass removal could cause localized erosion and sedimentation of waterways on a short-term basis. The types of mechanized equipment that would be involved under the proposed action to treat and thin forest vegetation include, but is not limited to, masticators, bull dozers, track-mounted mechanical harvesters, feller-bunchers, rubber-tired skidders, and fixed-track grapple skidders. This type of equipment has a high potential to disturb forest ground cover and expose bare soil, generating conditions that are conducive to high rates of erosion during and shortly following treatments. Such erosion of soil and sediment can lead to effects on downstream receiving waters as eroded material is transported by surface runoff and makes its way into receiving waterbodies. Sedimentation of waterbodies may threaten ecosystem health by producing effects on natural functions such as light penetration, temperature adjustment, bottom conditions, and retention of organic matter (NRCS 1995). Imbalances in these functions can lead to a degradation of hydrological conditions, producing detrimental effects on aquatic species such as increased mortality or chronic toxicity. The potential magnitude of effects is dependent on a number of factors, including the susceptibility of soils to detachment, the thickness of soil cover, the level of activity or disturbance, the connectivity of roads, the steepness of slope, local meteorological conditions, and the sensitivity of the receiving waterbody. These metrics have been evaluated in the cumulative watershed effects analysis for the project area watersheds, provided below.

A comprehensive set of design features based on Forest Service BMPs to protect soil and water conditions would be applied during project implementation (see Appendix A for the full list of design features that would be implemented as a part of the proposed action). These design features have been developed and designed for the project area with the above site-specific conditions relating to the susceptibility of soils to detachment, the thickness of soil cover, the level of activity or disturbance, the connectivity of roads, the steepness of slope, local meteorological conditions, and the sensitivity of the receiving waterbody. Implementation of the proposed action would likely result in erosion of soil and sediment within parts of the project area undergoing treatment and in nearby or adjacent areas. Because these effects would be realized during and immediately following treatment (one to two years following implementation), these would be direct effects of the proposed action. Application of these design features would ensure that potential adverse effects to water and soil quality and quantity would be avoided or minimized and would only occur

over a short period of time during project implementation and shortly thereafter. The design features include measures for the retention of soil cover, erosion control, minimizing disturbance, and restrictions on activities with a high potential for resource damage within RCAs. Monitoring of past forest fuel reduction and timber harvest activities within STF and other National Forests indicates that implementation of BMPs targeted at these types of forest management requirements are highly effective at limiting or preventing erosion and sedimentation of hydrologic resources (USDA 2012). In the long-term, disturbance areas would be rehabilitated, and ground cover restored. Treated areas of forest would return to steady-state conditions approximately two years following implementation of the project.

By comparison to not taking any action, the proposed action would result in a higher degree of short-term (less than two years following treatment), direct effects on soil and water conditions within the project area, because by not implementing the proposed action, there would be a continuation of existing conditions, and therefore no vegetation management activities that could disturb soil such as mechanical harvesting, log skidding, mastication, and biomass removal would occur. However, the indirect effects of the proposed action would be approximately the same or beneficial when compared to not taking any action, because treated areas would return to equilibrium conditions of erosion and sedimentation following treatments, and treated areas would be less susceptible to high intensity, high severity wildfires that have the potential to compromise or decimate forest soil cover and make it vulnerable to detachment and erosion that could degrade project waterways.

Road Construction and Maintenance

Road maintenance and reconstruction activities would be required along existing NFTS roads, and construction of less than one mile of temporary roads would be required to access some of the fuel treatment units. Activities related to the proposed action for road maintenance such as clearing, road grading, and travel over roadways would result in ground disturbance that could lead to short-term direct effects including accelerated erosion and sedimentation effects. Road surface treatments and improvements would involve initial ground disturbance, and a short period of erosional instability following completion of maintenance or construction (approximately 1 to 2 years [USDA 2012]).

Similar to the way that BMPs would be applied to forest fuels treatments, so too would they be applied, as appropriate, to road maintenance and temporary road construction. The FSH has robust measures for road-related activities that would reduce or minimize effects on aquatic features which would be applied to the proposed action. Such measures include full stabilization of project sites before wet weather, and implementation of an erosion control plan that specifically details the erosion control practices being implemented and where. Disturbance would be limited to the minimum necessary to maintain or construct roads, and roads themselves would be designed and constructed with features to minimize erosion. Road design features would include energy dissipators, minimum distance between stream crossings, culvert management, spring management, and slope stabilization. During road maintenance, roads would be watered as necessary to prevent fugitive dust emissions. Excess material from road-related activities would be disposed of in stable, dry areas, or transported off site for storage and use as future borrow. Fueling and servicing of equipment would be carried out under containment and would not be allowed in RCAs. Monitoring of past forest road maintenance and construction activities within STF and other National Forests indicates that implementation of BMPs targeted at these types of forest management requirements are highly effective at limiting or preventing erosion and sedimentation of hydrologic resources (USDA 2012). Consequently, it is expected that adverse

effects related to the road management would be both temporally and spatially limited and would therefore be minimized below the threshold of significance.

By comparison to not taking any action, the proposed action would result in a modest increase in the potential for direct effects on soil erosion and sedimentation during road maintenance and construction activities; however, as discussed above, these effects would be minimized through application of BMPs. Over time, the indirect effects of the proposed action would result in better-maintained roads that would be less susceptible to erosion from wet conditions and use, and therefore such effects would be beneficial by contrast to not implementing the proposed action.

Prescribed Fire

While the intent of prescribed fire is to produce low-intensity and low-severity fire that preserves favorable vegetation and soil conditions, it is possible that these controlled fires could burn at a higher intensity than intended and reduce soil cover below intended thresholds. Design features intended to protect riparian areas and water quality from prescribed fire are included. Monitoring of such design features elsewhere within STF and other National Forests has demonstrated that they are highly effective at limiting and preventing damage to obligate riparian species, soil cover, and protecting water quality (USDA 2012). With implementation of these design features, it is expected that direct and indirect effects related to prescribed fire would be both temporally and spatially limited and would therefore be minimized below the threshold of significance.

The effects of prescribed fire, both direct and indirect, would be neutral to beneficial when compared with not implementing the proposed action. This is because prescribed fires reduce fuel loading immediately following implementation while simultaneously retaining sufficient ground cover to limit exposed soil, thereby preventing excessive erosion. By reducing fuel loads, the risk of catastrophic wildfire that reduces or eliminates riparian shade and destroys forest cover would similarly be reduced. Steep areas where prescribed burning occurs would be less vulnerable to large-scale mass wasting events that could result in scour and highly disruptive riverine geomorphological changes than they would otherwise be in the event of a wildfire.

Cumulative Effects

Cumulative impacts are defined as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time" (40 CFR 1508.7). Cumulative Watershed Effects are defined as "[a]ll effects on beneficial uses of water that occur away from the location of actual land use which are transmitted through the fluvial system. Effects can be either beneficial or adverse and result from the synergistic or additive effects of multiple management activities within a watershed" (USDA 1988). The direct and indirect effects of the ground-disturbing activities included in the proposed action have the potential to persist during the short to medium term (i.e. two to 10 years) and combine with past, present, and reasonably foreseeable future projects within project watersheds to produce downstream effects, and potentially impact beneficial uses of water.

Forest Service Region 5 has developed a standardized methodology for evaluation of CWE (FSH 2509.22). A CWE analysis typically combines the existing level of land disturbance with the level of disturbance proposed under a project and compares it against a threshold level of concern for that watershed. For project area watersheds, the threshold of concern is between 10 and 12 percent.

This type of analysis requires numerical coefficients to be assigned to the existing level of disturbance and recovery within a watershed, as well as to the type of activity being proposed in each area. Cumulative watershed effects were assessed using Forest Service methodology (USDA 1988) and the Stanislaus National Forest CWE spreadsheet that implements the Region 5 Equivalent Road Acres (ERA) model (USDA 2003).

The ERA model is intended to predict the risk of cumulative effects, not actual effects. As such, it is intended to be an initial screen for focusing field evaluation priorities when implementing the proposed action and can successfully be used to compare effects between implementing the project or not implementing the project. Complete information on the ERA model and input parameters is contained in the CWE analysis (USDA 2020).

While project treatment acres would span seven HUC 7 watersheds, treatments would be concentrated primarily in the Whittles Upper Camp and Ganns HUC 7 watersheds; treatments in other HUC 7 watersheds comprised only 0.3 percent to 2.6 percent of the total watershed (Table 3.2-2). Given the small proportion of treatment acreage and the relatively low impact of proposed project treatments (e.g., forest thinning, prescribed fire), the proposed action would have little potential to influence CWE for these watersheds in a measurable way and, therefore, they were not included in the detailed CWE-ERA analysis.

Table 3.2-2 Treatment Acres within Hydrologic Unit Code 7 Watersheds

Hydrologic Unit Code (HUC) Name	HUC Size (acres)	Project Treatment Acres in HUC	Percentage of HUC to be Treated
Whittles Upper Camp	**6,571**	**4,145**	**63**
Ganns	**10,576**	**956**	**9**
Hells Kitchen	9,533	243	2.6
Boards Crossing-Lower North Fork Stanislaus River	8,382	23	0.3
Lower Highland Creek	10,193	60	0.6
Upper Beaver Creek	7,710	133	1.7
Middle Beaver Creek	8,166	141	1.7

Source: Modified from USDA 2020

Roads comprise the majority of existing ERA for both watersheds. In the Whittles Upper Camp HUC 7 watershed, ERA from previous activities come from timber harvest on private lands. Currently, there are no known future foreseeable activities on either private or USFS lands outside of the Prather Medusa project at the HUC 7 watershed scale that would influence ERA. For the Whittles Upper Camp HUC 7 watershed, ERA increases steadily at the start of project implementation in 2021 and reaches its maximum of 8.75 percent in 2025, then decreases and reaches a minimum value of 4.82 percent in 2030 at the end of the 10-year analysis period (Table 3.2-2). While 63 percent of this watershed is proposed for treatment, ERA values remain below the threshold of concern of 10 to 12 percent throughout the 10-year period analyzed. In the Ganns HUC 7 watershed, ERA from previous activities come from timber harvest on both private and USFS lands. Current and future activities include STF's Hemlock project on the other side of the Stanislaus River canyon. For the Ganns HUC 7 watershed, ERA increases slightly at the start of project implementation in 2021 and reaches its maximum of 3.52 percent in 2023 before slowly

decreasing to a minimum of 2.11 percent in 2030, the end of the 10-year analysis period (Table 3.2-2). At peak ERA, the Hemlock project accounts for a much higher proportion of total ERA (36 percent) than the proposed action (12 percent). Within the Ganns watershed, the proposed action has a relatively minor influence on ERA values which remain well below the threshold of concern throughout the analysis period.

In summary, cumulative effects estimated by the ERA modeling indicate that estimated CWE for the proposed action are below the threshold of concern of 10 to 12 percent for both HUC 7 project watersheds (Whittles Upper Camp and Ganns) throughout the 10-year period analyzed (Table 3.2-3).

As stated above, watershed conditions were assessed through the SSI field surveys in 2009. General field observations have also been made since that time. Although field data from 2009 are over a decade old, watershed conditions are unlikely to have changed considerably given that no large, landscape-level disturbances have occurred (e.g., large wildfire, widespread logging on private lands) that would invalidate the general findings of the original field assessment. Additionally, since 2009 several restoration projects have been implemented that have contributed to improving watershed conditions. Conditions have improved in SAFs that have been fenced from livestock disturbance. Channel and floodplain function have improved in Big Rattlesnake Creek since the removal of a culvert in 2013 that was impeding downstream bedload sediment movement. Available field data indicate project area watershed conditions are generally good overall and do not show evidence of existing cumulative effects and, therefore, are not at elevated risk of experiencing adverse CWE as a result of the proposed action.

Table 3.2-3 CWE-ERA Summary for HUC 7 Watersheds in the Project Area

	Annual % ERA									
	2021	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**
Whittles Upper Camp HUC 7	3.38	4.88	6.60	8.17	8.75	8.19	7.50	6.73	5.84	4.82
Ganns HUC 7	2.69	3.03	3.52	3.32	3.10	2.91	2.69	2.50	2.32	2.11

If the project were not implemented, ERA would not be increased in the CWE HUC 7 analysis watersheds because project activities would not occur; therefore, risk of adverse cumulative effects would not increase and would remain low. However, without the proposed action, fuels reduction objectives would not be met because heavy fuel loadings would not be treated and would continue to pose an increased risk of future high severity wildfire and its attendant effects on watershed health.

3.3. Recreation, Public Safety, and Visual Resources

Affected Environment

Recreation

In 2017, STF served a total of 1,085,000 visitors, of which approximately 855,000 visited general forest areas similar to the project area (USDA 2017a). Forest visitors primarily come from the surrounding counties and utilize developed recreational facilities or dispersed areas for single day trips.

Recreational activities in the project area include camping, hiking, fishing, hunting, photography, nature viewing, horseback riding, picnicking, and OHV use (USDA 2019). Activities at Lake Moran, on the northern edge of the project area, include fishing, kayaking, and canoeing. Within STF as a whole, the most common recreation activities include relaxing, downhill skiing (which does not occur in the project area), hiking/walking, fishing, and other non-motorized activities (USDA 2017a). Off-highway vehicle use is also common throughout the STF.

The project area does not include developed recreation facilities, although it contains approximately 60 miles of NFTS roads (Figure 3.3-1). The roads offer a range of recreation opportunities, including OHV use and mountain biking. The road system is mostly used during the summer and more heavily during the fall deer-hunting season. The project area is used by hunters during archery season (mid-August to early September) and deer season (the third week in September to the middle of October). The project area also includes 69 dispersed campsites, which are used in the summer through the fall deer-hunting season.

Public Safety

The greatest existing public safety risk to visitors in the project area is the potential for wildfire. Fuel conditions within the project area vary based on previous treatments, weather conditions, and fuel types. Pockets of slash remnants from previous salvage harvests, combined with the effects of years of fire exclusion, resulted in a buildup of dead and down ground fuels, and understory ladder fuels. These conditions are conducive to high-intensity surface fire and torching which increase the likelihood of stand replacing high intensity fires to occur under typical summer weather conditions. Other existing safety risks include the potential for hazard trees and vehicle accidents. The number of OHV users and the condition of roads are primary factors affecting the risk of vehicle accidents in the project area.

Visual Resources

All projects in concentrated areas of public use and that are visible from major travel routes are required to meet adopted Visual Quality Objectives (VQO; USDA 2017a) to maintain high visual quality. The northern portion of the Project area contains approximately 237 acres of land designated for Partial Retention (Figure 3.3-2). Treatment activities that occur in Partial Retention areas are subject to all applicable standards in guidelines from the 2017 Forest Plan Direction (USDA 2017b). The remainder of the project are within areas designated as Modification areas.

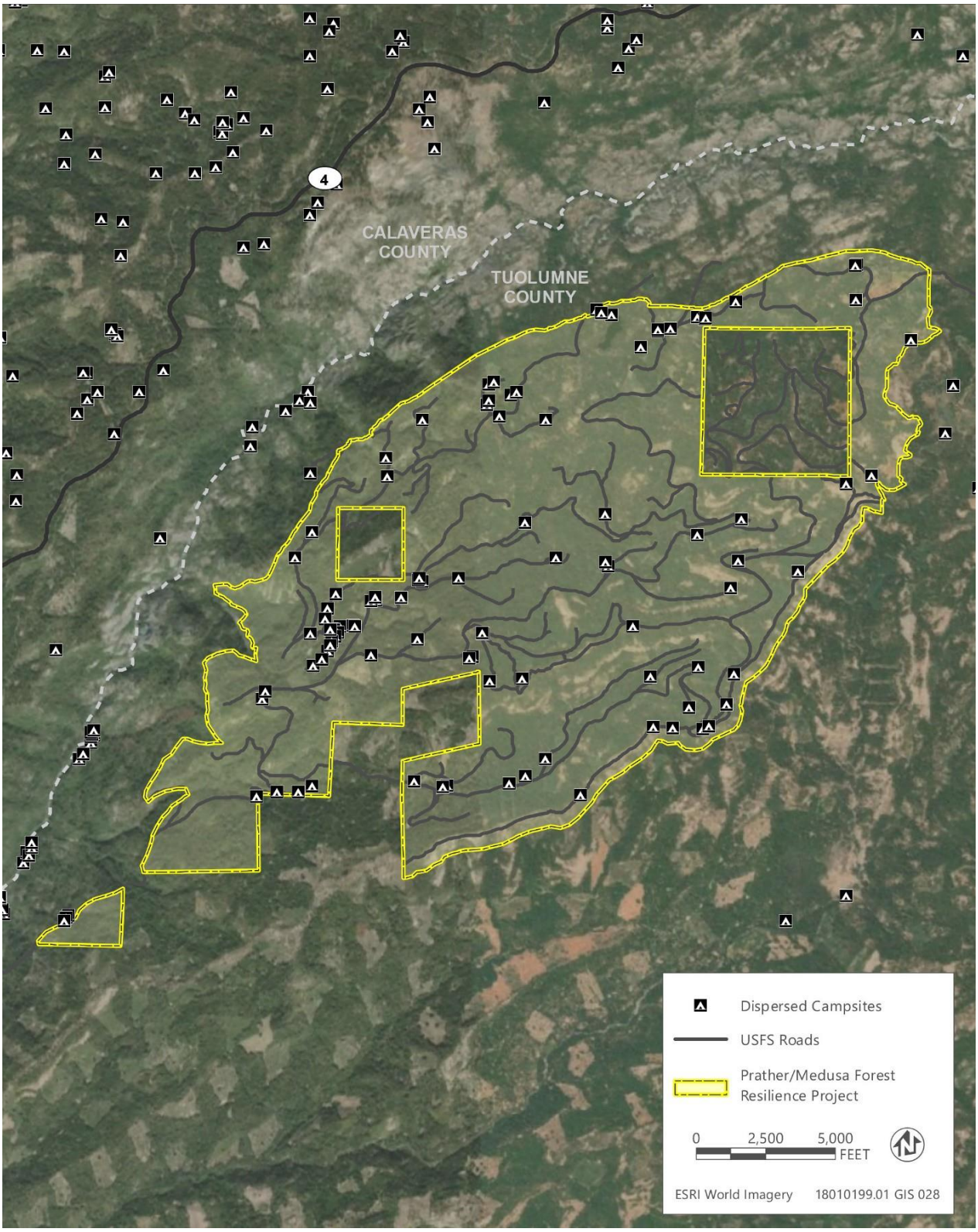


Figure 3.3-1 Recreation Resources

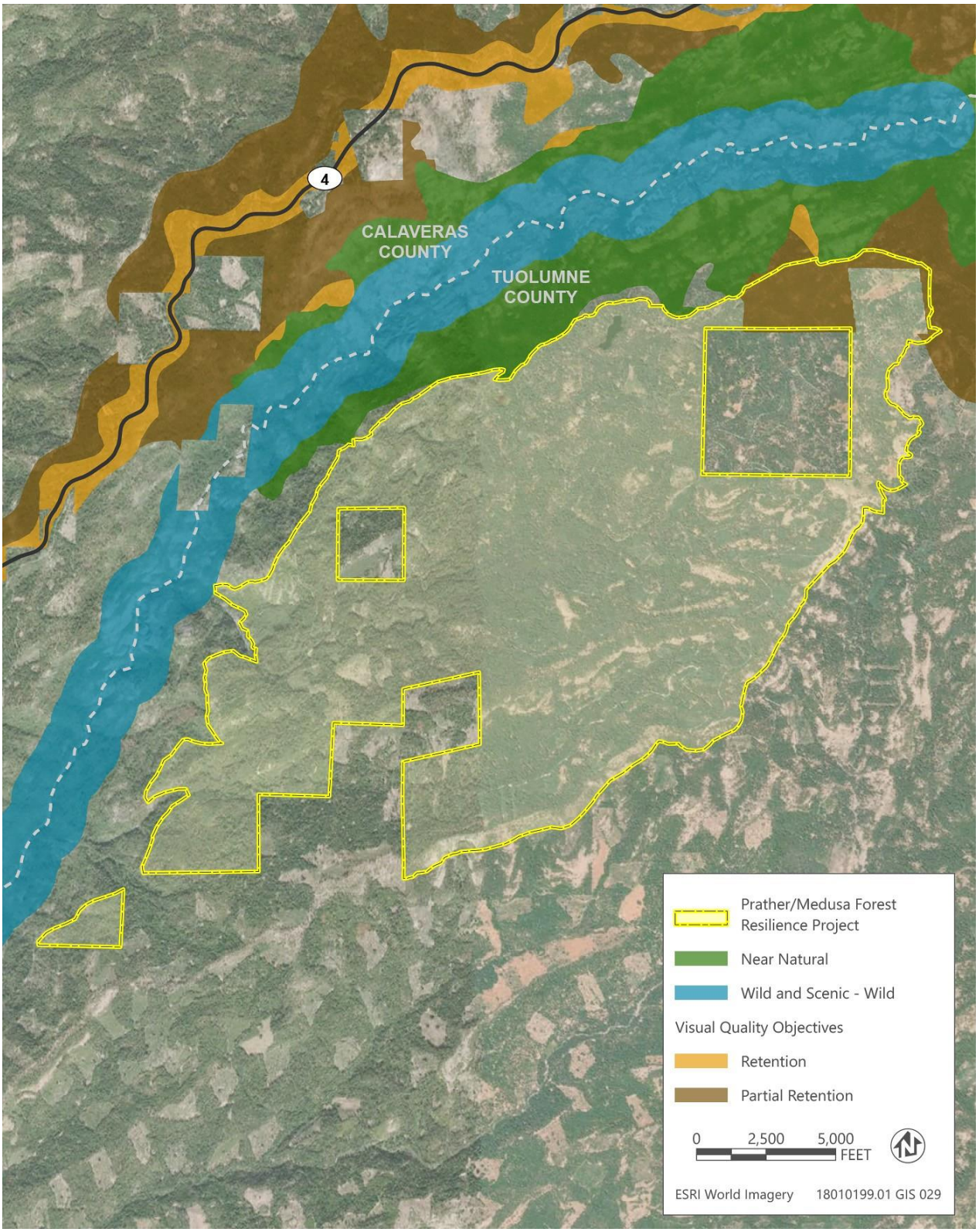


Figure 3.3-2 Designated Scenic Corridors

The North Fork of the Stanislaus River, located to the north of the project area, is eligible for designation as a Wild and Scenic River. The eligible section of the river includes all 23 miles of eligible segments of the North Fork Stanislaus River, from Highland Creek to the confluence with the Middle Fork Stanislaus River. This segment of river provides an outstanding scenic landscape including a deep, U-shaped, glacially carved canyon. The river provides a variety of water forms including rapids, cascades and pools. The surrounding mountain scenery attracts thousands of visitors each year. The scenic quality of the river and its canyon is a major attraction (USDA 1991).

Environmental Consequences

Recreation

Direct and Indirect Effects

The primary effects on recreation would be short-term and occur during implementation of forest treatment activities. As a standard practice, STF would enact temporary public use closures in areas where the public may encounter work activities. Typically, areas would be temporarily closed while they are being treated when they are within the vicinity of a forest road, user-created trail, or other areas where the public could reasonably be expected to come into contact with active work activities. The effects of temporary closures would be more substantial in areas that receive high volumes of use, such as popular trails and campsites. No developed campgrounds are located in the project area and as such temporary closures would only impact dispersed campsites. Temporary closures of campsites and trails would not have a substantial effect on recreation, because of the large number of dispersed campsites available within the project area and in the general vicinity outside of the project area. Temporary closures would also occur through the late summer and fall deer hunting season when recreational use of the project area is highest. This would have a direct effect on recreational use by displacing hunters who would otherwise use the project area. However, the effect of the closures would not be substantial, because they would occur in portions of the project area where active treatment activities are occurring, while other portions of the project area would remain open to hunting. Furthermore, at approximately 7,132 acres, the project area represents less than one percent of the public land available for hunting within STF. In addition, public noticing of temporary closures would occur. Thus, recreation users would be aware of temporary closures and able to make alternate plans to access other sites. As descripted above, the proposed action would directly displace recreation users through temporary closures, however the closures would be temporary and limited to active work areas, and the public would be notified of closures in advance and have access to alternate sites to recreate in the vicinity of the project area. While the above-described direct effects would not occur without implementation of the proposed action, such effects on recreation would be negligible because they would be localized, affect a small user group, and would be of short duration.

The proposed action is expected to result in indirect long-term beneficial effects on recreation. Road maintenance activities would maintain and improve public access to dispersed recreation opportunities within the project area relative to not implementing the action, which could result in more restricted access due to deteriorating road conditions. By reducing stand density and fuel loading, the proposed action would decrease the risk of future high-severity wildfire. This would be an indirect beneficial effect to recreation, especially relative to future conditions without implementing the proposed action, which could result in a loss of high-quality recreational opportunities for extended periods following extreme wildfire events.

Cumulative Effects

The short-term, cumulative effects on recreation opportunities would be similar to the direct and indirect effects of the proposed action because other forest closures or activities that could disrupt recreational use are not planned within the vicinity of the project area during the same time that the proposed action would occur. Thus, the direct and indirect effects of the proposed action would not combine with the effects of other cumulative projects to exacerbate the effects of the proposed action. Long-term, cumulative effects of the proposed action would be beneficial because the proposed action in combination with other previously approved road improvements would contribute to improved access to recreational opportunities and a reduced risk of catastrophic wildfire relative to future conditions without implementing the proposed action.

Public Safety

Direct and Indirect Effects

The proposed action would result in a short-term increase in traffic on NFTS roads associated with crews, equipment, and logging trucks. Increases in traffic can increase the risk of vehicle accidents, particularly when NFTS roads are in poor condition. However, the increase in worker-related trips would be temporary in nature and dissipated throughout the extensive roadway network nearby and throughout the project vicinity. As a standard practice, the proposed action would include appropriate signage to notify forest users of project activities and traffic. STF would also institute temporary forest closures in active work areas, which would reduce traffic from forest users. The proposed action would also include road maintenance and reconstruction as necessary to provide safe access. If forest treatments did not occur, there would be no project-associated vehicular traffic; but there would also not be a need for road improvements and so none would be implemented. For the reasons described above, the overall risk of vehicle accidents associated with the proposed action would be negligible.

Forest resilience treatments, including mechanical thinning and prescribed burns include safety risks for Forest Service employees, their contractors, and to the public that recreate within affected portions of the project area. As required by the FSH, STF will maintain a safety plan specific to this project that includes a job hazard analysis, including personal protective equipment needs. This safety plan would be consistent with the requirements of FSH Sections 6709.11 and 2109.14 & 16. Prescribed burning would be subject to all standards and guidelines of the 2017 Forest Plan Direction, and would adhere to procedures described in the Interagency Prescribed Fire Planning and Implementation Procedures Guide (NWCG 2017). These procedures address minimum requirements for prescribed fire planning and implementation that address risk management and prioritize public safety. Implementation of the safety plan and compliance with FSH, Forest Plan, and Interagency Prescribed Fire Planning and Implementation Procedures would minimize safety risks to workers and the public. As described above, active work areas would be closed to the public, which would avoid direct safety hazards to members of the public. Hazardous air pollutant emissions associated with project activities are addressed in more detail in Section 4.5, Air Quality and Climate Change.

Over the long-term, implementation of the proposed action would reduce the risk of large-scale wildfire events relative to future conditions without implementing the proposed action (see Section 4.6, Fire Hazard and Fuels). As such, the proposed action would result in indirect long-term, beneficial effects on public safety related to wildfires.

Cumulative Effects

The proposed action would contribute to a beneficial cumulative effect on public safety. The proposed action would decrease fuel loads and reduce the likelihood of catastrophic wildfire (see Section 4.6, Fire Hazard and Fuels). Additionally, road maintenance and reconstruction included in the proposed action in combination with previously authorized roadway improvements from the 2012 EA would result in safer roadway conditions for forest users.

Visual Resources

Direct and Indirect Effects

Forest resilience treatments included in the proposed action would result in direct and indirect effects on visual resources. The North Fork of the Stanislaus River, located to the north of the project area, is eligible for designation as a Wild and Scenic River. This segment of river provides outstandingly remarkable scenic values including a deep, U-shaped, glacially carved canyon, and a variety of water forms including rapids, cascades and pools. These values would not be affected by the proposed action because the project area would be completely blocked from view from the river by the steep canyon sides and intervening ridgeline.

The majority of the project area would not be visible from major roads or from scenic corridors, because of the distance from SR 4, the closest designated scenic corridor and intervening topography (see Figure 3.3-2). SR 4 is approximately 1.5 miles from the project area and is separated from the project area by the North Fork Stanislaus River canyon. Portions of the project area, including the areas designated for Partial Retention VQOs in the northeastern portion of the project could be partially visible by passing travelers but in the distant background, so the treated landscape would not contrast substantially with the surrounding forest views from SR 4. The portion of the project area designated for Partial Retention includes primarily areas where no treatment is proposed or General Forest and HRCA Treatment Emphasis Areas, with limited areas of WUI and PACs. These treatment emphasis areas are arranged in natural-appearing irregular patterns that reflect existing forest and habitat structure. Implementation of treatments in these areas would maintain a natural appearing forest with variable canopy closure and an uneven distribution of trees. No fuel breaks or other linear features are proposed within the Partial Retention area, thus treated areas would remain characteristic of the existing landscape and treatment activities would reflect the form, line, color, and texture common to the characteristic landscape, which would maintain the Partial Retention VQOs and maintain the existing visual character of the site as viewed from SR 4.

From NFTS roads and dispersed recreational areas within and directly adjacent to the project area, treated areas would be more visible but would continue to resemble the surrounding natural areas. Reduction of forest stand density and canopy cover would immediately open views farther into the forest, but would not fundamentally alter the character of existing views, which would continue to reflect a natural-appearing forest landscape, which would meet and exceed the modification VQOs, that apply to the majority of the Project Area. Thus, the long-term, direct visual effects would be negligible.

During active periods of operations, mechanical equipment, landings, slash piles, and smoke from prescribed burns would be visible. However, as described above, active treatment areas would be closed during active periods of operations, so equipment and operations would not be visible to forest users. In addition, treatment activities would be conducted in accordance with design feature

REC-1. Design feature REC-1 would require, where practical, that slash piles would be located where they are the least visible to forest users, and where that is not practical, they would be removed at the earliest opportunity, thus minimizing potential adverse short-term visual effects.

The use of mechanical equipment and prescribed burns would cause temporary visual disruptions in the form of wheel or track marks and burned areas, respectively. These effects would be quickly masked by understory growth. For these reasons, the short-term visual effects of the proposed action would be negligible.

The proposed action would result in a number of long-term indirect benefits to visual resources. Implementation of the treatment activities would increase tree, stand, and landscape resiliency by removing dead and dying trees, reducing competition between remaining trees, and producing variable densities of trees with an uneven arrangement of individual trees, small groups or clumps, and openings within the stand. A reduction in forest stand and crown density as well as an increase in the height to canopy would facilitate views farther into the forest, but would not change the character of existing views, which would continue to appear as a natural forest landscape. Furthermore, the proposed action would reduce the risk of large-scale stand replacing fire as compared to not taking any action, which would protect visual resources. Therefore, indirect long-term effects on visual resources would be beneficial.

Cumulative Effects

The cumulative effects on visual resources are consistent with the direct and indirect effects because there are no current or reasonably foreseeable future actions that would affect visual resources in the project area.

3.4. Cultural Resources

Introduction

All sites will be avoided or treated in accordance with the "Programmatic Agreement among the USDA Forest Service, Pacific Southwest Region, California State Historic Preservation Officer, Nevada State Historic Preservation Officer, and the Advisory Council on Historic Preservation Regarding the Process for Compliance with Section 106 of the National Historic Preservation Act for Management of Historic Properties by the National Forests of the Pacific Southwest Region" (2018) For specific treatments, see Project Compliance Letter (Strain 2020; CRMRs 05-16-2382 and 05-16-2382B).

Prior to implementation of actions under the project, the District Archaeologist shall be contacted to ensure sites are flagged and determine if any assessments are needed due to a change in condition. Should any cultural resources be discovered during implementation, all project activities shall cease, and the District Archaeologist shall be notified. See Project Compliance Letter (Strain 2020; CRMRs 05-16-2382 and 05-16-2382B) for specific requirements.

Affected Environment

A Cultural Resource Management Report was prepared in March 2020 for the project area. Preparation of the report consisted of a data search of the plan area as well as an intensive survey of the project area, conducted in 2019. Results from the data search indicate that 1,416 acres of the project area have been previously surveyed for cultural resources and 45 sites have been previously recorded. Of the 45 previously recorded sites, none have been formally evaluated for eligibility for the National Register of Historic Places (NRHP). Eligible or potentially eligible sites include milling stations, lithic scatter, midden, historic structures, and trees.

The 2019 survey of the project area included 4,845 acres of new intensive survey coverage and 1,180 acres of resurvey done in the process of revisiting previously recorded sites. The 2019 survey identified 32 previously undocumented resource sites, all of which were fully recorded. Newly documented resources included a road segments, trail segments, and milling stations. The 2019 survey also recorded 41 isolated finds. Isolates are defined as one or two artifacts occurring by themselves and not associated with an archaeological site. Because they have no historical context, isolates are generally not eligible for listing in the NRHP and, therefore, are not evaluated for significance. All of the sites (previous and new) are unevaluated under the NRHP and are considered to be resources of interest.

The Forest Service has initiated Section 106 consultation with the following tribes: the Tuolumne Band of Me-Wuk, Chicken Ranch Tribal Council, Washoe Tribe of Nevada and California, and the California Valley Miwok Tribe, also known as the Sheep Ranch Rancheria of Me-Wuk Indians of California. No tribes have provided formal comments or concerns related to the project.

Environmental Consequences

Direct, Indirect, and Cumulative Effects

The proposed action and identified fuels treatment application methods would be carried out in accordance with the Programmatic Agreement (PA), as described above. By including protection

measures as outlined in the PA, as well as the design criteria listed in Appendix A, the proposed action complies with Section 106 of the National Historic Preservation Act. For activities that would be carried out that are determined not to meet the definition of Exempt (Class A) or Screened (Class B) Undertakings of the PA, such as pile burning in culturally sensitive areas or possible disturbance to historic properties, the proposed action would include Standard Protection Measures (SPM) to protect cultural resources. These include avoidance, protection, and delineation of historical properties (SPM E.1, E1.3), minimizing surface disturbance and directional felling (E.2.2[b][1][G]), and siting vegetation burn piles away from historic property boundaries (E.2.2[b][1][H]). These SPMs would safeguard against conducting activities that would conflict with the PA in areas of cultural or historical resources; therefore, there would be no direct, indirect, or cumulative adverse effects on cultural resources.

3.5. Air Quality and Climate Change

Introduction

The project area is within the Mountain Counties Air Basin (MCAB). The potential for emissions of criteria air pollutants and precursors, hazardous air pollutants (HAPs), and greenhouse gases (GHG) is discussed below.

Criteria Air Pollutants

Concentrations of criteria air pollutant emissions are used to indicate ambient air quality. Criteria air pollutants include ozone, carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide, particulate matter with a diameter less than 10 micrometers (PM_{10}) and less than 2.5 micrometers ($PM_{2.5}$), and lead.

Greenhouse Gas Emissions

Certain gases in the atmosphere, classified as greenhouse gases (GHGs), play a critical role in determining the earth's surface temperature. Prominent GHGs contributing to the greenhouse effect are carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride. Anthropogenic emissions of these GHGs in excess of optimal ambient concentrations are responsible for intensifying the greenhouse effect and leading to a trend of unnatural warming of the earth's climate.

Affected Environment

Weather patterns within the project area are typical of the western Sierra Nevada and foothills. Precipitation comes in the form of rain and snow concentrated primarily between the months of October through April. Drought has been a factor influencing forest conditions within the project area, and regionally, with below average precipitation in the Sierra climate region during 12 of the 19 years between 2000 and 2018 (WRCC 2020). Based on analysis using the Cal-Adapt tool, annual average temperatures in Tuolumne County where the project area is located are projected to rise from 6.2 to 9.0°F by 2090, a range based on low and high emissions scenarios (Cal-Adapt 2019).

The project area is located in the Tuolumne County portion of the MCAB, which is under the jurisdiction of the Tuolumne County Air Pollution Control District (TCAPCD). MCAB is currently designated as being in attainment of the national ambient air quality standards (NAAQS) for all criteria air pollutants except ozone (CARB 2019a).

Criteria Air Pollutants

The Clean Air Act (CAA) requires EPA to establish NAAQS for all six criteria air pollutants. The NAAQS are shown in Table 3.5-1, which includes the primary ambient standards created to protect public health with an adequate health margin for safety. The CAA also requires each state to prepare a State Implementation Plan (SIP) for attaining and maintaining the NAAQS in all of its air basins. SIPs are not single documents; they are a compilation of new and previously submitted plans, programs (such as monitoring, modeling, and permitting), district rules, statewide regulations, and federal controls. California has developed SIPs for ozone and particulate matter ($PM_{2.5}$) nonattainment areas.

The 1990 amendments of the Clean Air Act include the General Conformity Rule. It states that in federal nonattainment areas, before actions can be taken on federal lands that have the potential to emit pollutants to the atmosphere, a determination must be made that the action conforms to the SIP. Pursuant to 40 CFR 93.153 (i), prescribed fire conducted in accordance with a smoke management program is presumed to conform to the SIP.

Table 3.5-1 Ambient Air Quality Standards and Designations - Mountain Counties Air Basin

Pollutant	Averaging Time	California		National[1]	
		Standard[2, 3]	Attainment Status[4]	Standard[3]	Attainment Status[4]
Ozone	1-hour	0.09 ppm (180 µg/m^3)	Nonattainment	–	–
	8-hour	0.070 ppm (137 µg/m^3)		0.070 ppm (137 µg/m^3)	Nonattainment (Marginal)[5]
Carbon Monoxide (CO)	1-hour	20 ppm (23 mg/m^3)	Attainment	35 ppm (40 mg/m^3)	Attainment
	8-hour	9 ppm (10 mg/m^3)		9 ppm (10 mg/m^3)	
Nitrogen Dioxide (NO_2)	Annual Arithmetic Mean	0.030 ppm (57 µg/m^3)	Attainment	0.053 ppm (100 µg/m^3)	Attainment
	1-hour	0.18 ppm (339 µg/m^3)		0.100 ppm (188 µg/m^3)	
Respirable Particulate Matter (PM_{10})	Annual Arithmetic Mean	20 µg/m^3	Attainment	–	–
	24-hour	50 µg/m^3		150 µg/m^3	Attainment
Fine Particulate Matter ($PM_{2.5}$)	Annual Arithmetic Mean	12 µg/m^3	Attainment	12.0 µg/m^3	Attainment
	24-hour	–	–	35 µg/m^3	
Visibility-Reducing Particle Matter	8-hour	Extinction of 0.23 per km —visibility of 10 miles or more	Unclassified	–	

Notes: µg/m^3 = micrograms per cubic meter; ppm = parts per million; "–" = not applicable

[1] National standards (other than ozone, PM, and those based on annual averages or annual arithmetic means) are not to be exceeded more than once a year. The ozone standard is attained when the fourth highest 8-hour concentration in a year, averaged over 3 years, is equal to or less than the standard. The PM_{10} 24-hour standard is attained when 99 percent of the daily concentrations, averaged over 3 years, are equal to or less than the standard. The $PM_{2.5}$ 24-hour standard is attained when 98 percent of the daily concentrations, averaged over 3 years, are equal to or less than the standard. Contact EPA for further clarification and current federal policies.

[2] California standards for ozone, CO (except in the Lake Tahoe Air Basin), SO_2 (1- and 24-hour), NO_2, PM, and visibility-reducing particles are values that are not to be exceeded. All others are not to be equaled or exceeded. California Ambient Air Quality Standards (CAAQS) are listed in the Table of Standards in Section 70200 of Title 17 of the California Code of Regulations.

[3] Concentration expressed first in units in which it was promulgated [i.e., parts per million (ppm) or micrograms per cubic meter ($\mu g/m^3$)]. Equivalent units given in parentheses are based upon a reference temperature of 25°C and a reference pressure of 760 torr. Most measurements of air quality are to be corrected to a reference temperature of 25°C and a reference pressure of 760 torr; ppm in this table refers to ppm by volume, or micromoles of pollutant per mole of gas. Secondary national standards are also available from EPA.

[4] Unclassified: pollutant is designated unclassified if the data are incomplete and do not support a designation of attainment or nonattainment.

Attainment: pollutant is designated attainment if the state standard for that pollutant was not violated at any site in the area during a 3-year period.

Nonattainment: a pollutant is designated nonattainment if there was a least one violation of a state standard for that pollutant in the area. Nonattainment designations for ozone are classified as marginal, serious, severe, or extreme depending on the magnitude of the highest 8-Hour ozone design value at a monitoring site in a nonattainment area.

[5] Marginal nonattainment (ozone): Area has a design value of 0.071 up to but not including 0.081 ppm.

Source: CARB 2016a, CARB 2018a, EPA 2019; data compiled by Ascent Environmental in 2019.

Environmental Consequences

Criteria Air Pollutants and HAPs

Direct and Indirect Effects

Implementation of the proposed action would result in an increase in emissions of criteria air pollutants and precursors generated during treatment activities, including mechanical and manual treatments, and prescribed burning. Emissions associated with these treatments would include exhaust generated by off-road equipment and machine-powered hand tools; exhaust from on-road vehicles produced during trips associated with worker commutes and transport of equipment, as well as the mechanical removal and hauling of sawlogs and other forest products (e.g., chips, mulch, firewood); fugitive dust emissions generated by ground disturbance activities and vehicle travel on unpaved roads, including PM_{10} and $PM_{2.5}$; and smoke generated by the combustion of vegetation during prescribed burning.

Wildfires and prescribed burns produce smoke, which is composed of a complex mixture of CO_2, water vapor, CO, particulate matter, hydrocarbons, ROG, NO_X, trace minerals, and other organic chemicals specific to wood smoke (e.g. levoglucosan, mannosan, galactosan). There are thousands of individual compounds present in smoke, including several HAPs. Smoke composition can vary widely and depends on multiple factors, including how efficiently a fuel burns, the fuel type and moisture content, the fire temperature, wind conditions, and other weather-related influences. Different types of wood and vegetation are composed of varying amounts of cellulose, lignin, tannins and other polyphenols, oils, fats, resins, waxes, and starches, which produce various compounds that are released as smoke when burned (CARB et al. 2019). While both wildfires and prescribed burns produce smoke, wildfire smoke presents a greater health hazard than smoke from prescribed burns.

The primary pollutant of concern from smoke is $PM_{2.5}$, a criteria air pollutant for which a NAAQS and CAAQS have been established. While classified as a criteria pollutant, $PM_{2.5}$ is composed of complex aggregates of carbonaceous core particles coated with various other pollutants, including HAPs, depending on the specific PM source. As compared to PM_{10}, $PM_{2.5}$ is also transported farther from a burn site and can cause more severe adverse health impacts because of its ability to penetrate more deeply into lung tissue. Emergency medical interventions for cardiovascular and respiratory symptoms increase in wildfire smoke–affected areas. Specifically, patients exposed to wildfire smoke are more likely to visit the emergency room for heart- and stroke-related illnesses (Wettstein et al. 2018) as well as acute symptoms related to asthma, bronchitis, dyspnea, and chronic obstructive pulmonary disease (Dohrenwend et al. 2013; Black et al. 2017). Typically, wildfire smoke produces proportionately higher concentrations of $PM_{2.5}$ compared to PM_{10}. ROG

emissions may oxidize with NO_X emissions from fire and other sources to contribute to spikes in ground-level ozone (NCAR 2008). Exposure to ozone may result in acute and chronic health impacts including coughing, pulmonary distress, lung inflammation, shortness of breath, and permanent lung impairment.

Before any prescribed burning within the project area, a smoke management plan (SMP) would be submitted to and approved by TCAPCD. The SMP specifies the conditions in which a prescribed burn will not lead to an exceedance of any NAAQS (or CAAQS). On these "burn days," atmospheric and meteorological conditions are optimal to provide adequate mixing and dispersion of pollutants at low concentrations and prevent exposure to unhealthy smoke concentrations. Thus, the SMP is written such that criteria emissions produced during a prescribed burn will not conflict with SIP strategies to maintain or achieve attainment of the NAAQS (EPA 1998).

In addition to the requirements of the SMP, during prescribe pile or understory burning, close coordination would take place between the Forest Service and TCAPCD, following the Smoke Management Guidelines for Agricultural and Prescribed Burning contained in Title 17 of the California Code of Regulations (CARB 2001). Prescribed burns are conducted in small areas under very controlled conditions and are also closely coordinated with TCAPCD and CARB to ensure that meteorological conditions are optimal for preventing excessive exposure of receptors to smoke. Given the unpredictability of wildfire, the variability in HAP emission characteristics of wildfire fuels (i.e., type of vegetation, man-made structures), and the increased intensity and duration of wildfires, the closely controlled, prescribed burns under the proposed action would produce relatively smaller quantities of less toxic emissions, on fewer days of the year, and thus the health risks to nearby receptors would be reduced by implementing the proposed action, when compared to wildfire emissions that could occur without implementation of the proposed action.

Cumulative Effects

Implementation of treatments under the proposed action would result in short-term increases in emissions of criteria pollutants and HAPs during prescribed burns, as well as from equipment and vehicles used during hand and mechanical treatments. The emission of multiple HAPs, including diesel exhaust particulate matter (diesel PM), by these sources under the proposed action, could potentially have a cumulative effect on air quality in locations where receptors experience exposures to high concentrations of HAPs over an extended time period. However, because of the short, periodic nature of treatments, criteria and HAPs emissions would be limited to treatment days, and sustained exposures that result in increased lifetime cancer risk would not occur. Additionally, concentrations of criteria pollutants and HAPs would not be high enough to pose any acute health risks to nearby receptors.

Regarding the potential for exposure to criteria pollutants and HAPs in smoke generated by prescribed burns, adherence to air district regulations and an approved SMP, along with close coordination with TCAPCD, would ensure the exposure would be minimized. Additionally, as compared to uncontrolled wildfires that would be expected under future conditions without implementation of project activities, concentrations of criteria emissions and HAPs generated during prescribed burns are much lower. Therefore, the proposed action's contribution to health risks associated with exposure to criteria pollutants and HAPs would not considerably contribute to the cumulative effects on the environment or nearby receptor health risk.

Greenhouse Gas Emissions

Direct and Indirect Effects

GHG emissions resulting from forest treatment activities may vary widely according to multiple factors including the amount of vegetation removed or treated per acre, the frequency of treatments, the number of workers and equipment needed for each treatment project, and the types of equipment used. In addition to short-term treatment-related emissions, the proposed action is intended to decrease the severity of wildfires over the long term, resulting in the potential for reduced GHG emissions and increased levels of sequestered carbon. The state of the science, however, makes it infeasible to produce reliable, quantified estimates of potential long-term changes in GHG emissions or carbon sequestration that may result from these treatments overtime.

The effect of vegetation treatment on the carbon content of the landscape over the long term—by reducing occurrences of high-severity wildfires and/or by increasing the carbon sequestration potential of vegetated landscapes—continues to be the focus of scientific research and model development, particularly in tree-dominated landscapes. The current body of research presents various and inconsistent findings regarding the effects of treatments on the long-term carbon emission or sequestration of forested lands. A review of the scientific literature in the *Draft California 2030 Natural and Working Lands Climate Change Implementation Plan* indicates that, in a broader context, treatment activities reduce vegetation densities and fuel loads, restore the structure and composition of ecosystems, and may lower the potential for damaging, high-severity fire, which is currently the primary source of GHG emissions and carbon loss from the natural and working lands sector (Stephens et al. 2007; Campbell et al. 2007; Hurteau et al. 2008; Hurteau and North 2009; and North et al. 2009—all cited in CalEPA et al. 2019:14). Additionally, it finds that future vegetative growth on treated acres would result in carbon sequestration over time. Consequently, the effects of implementing the proposed action versus not implementing the proposed action are not well understood, but might be expected to range from neutral to modestly beneficial.

Cumulative Effects

The effects of GHGs on climate are inherently cumulative. Thus, analysis of an individual action's direct and indirect effects resulting from GHG emissions is not practical or meaningful. While GHG emissions produced in any specific location do contribute to cumulative global concentrations in the atmosphere, any individual forest treatment alone would not substantially change global GHG concentrations and would not produce a discernible effect on the earth's climate or ambient temperatures. Therefore, it is more appropriate to consider these emissions in their cumulative effect on the environment.

Consistent with the goals of the proposed fuel treatments to decrease the occurrence of high-severity wildfires and increase the potential rates of carbon sequestration, implementation of the proposed action could result in a cumulative net carbon benefit over the long term, which is the most relevant timeframe and global context of GHG-caused, climate change–related environmental effects. However, there is uncertainty in predicting future wildfire occurrence, related emissions, and carbon sequestration rates, which are highly variable and depend on many factors. Future wildfire intensities and carbon sequestration in treated areas are the subjects of continued scientific research and debate.

3.6. Fire Hazards and Fuels

Introduction

Wildfire is a natural and important part of the ecological process within the project area; however, the impact and risks from wildfire have been compounded by climate change, recent droughts, decades of fire suppression activities, insect infestations, populations of invasive plant species, and the challenges from increased human ignitions associated with population growth in the WUI and continued use of areas within STF for recreation, grazing, and other activities.

Affected Environment

Weather patterns within the project area are typical of the western Sierra Nevada and foothills. Precipitation comes in the form of rain and snow concentrated primarily between the months of October through April. The mountainous terrain is conducive to the development of thunderstorms, which can result in lightning strikes during the summer and fall, when fire danger is at its peak. Drought, like fire exclusion and preferential harvesting practices, has also been a factor contributing to physiological stress on individual trees, reducing their resilience to pathogens, pests, and wildfire. Fir mortality is high under drought conditions; therefore, as temperatures rise and drought continues to become more prevalent with climate change (see Section 4.5, Air Quality and Climate Change), stressors are expected to increase. Drought has been a factor influencing forest conditions within the project area, and regionally, with below average precipitation in the Sierra climate region during 12 of the 19 years between 2000 and 2018 (WRCC 2020).

CAL FIRE identifies the project area as within a very high fire hazard severity zone (CAL FIRE 2008). Regionally, there have been several fires within the last few years, including the Ramsey Fire in 2012, which burned 1,137 acres near Highway 4, approximately 8 miles east of Dorrington, within the Ganns-Middle North Fork Stanislaus River watershed. Other fires included the 2018 Donnell Fire, which burned 36,450 acres in Tuolumne County along the border with Alpine County within STF; and the 2013 Power Fire, which burned 1,070 acres near Beardsley Lake within STF. Farther from the project area were the 2017 Summit Complex Fire and the 2017 Creek Fire, both within STF.

The ecosystem of the project area is dominated by Sierran mixed conifer and red fir forest, but also consists of montane chaparral, Jefferey pine, montane-hardwood conifer, grasslands, and hardwoods; and lesser areas of meadows, riparian zones, and wetlands (USDA 2016, Ascent 2019, CDFW 2019). Past forest management in the project area has been focused on fire exclusion and preferential harvesting of large diameter trees, which has led to an overabundance of smaller, younger, and less fire-resistant trees over large portions of the project area, making it very susceptible to catastrophic wildfire. These past management policies within the project area have also produced a lack of diversity in age, diameter, density, species composition, and vertical structure of the forest, making it vulnerable to increased patterns of insect and pathogen outbreaks. Such outbreaks reinforce the shift in vegetative species composition and stand structure, while further increasing hazardous surface fuel loads.

As stated above, red fir is one of the dominant habitat types within the project area. It is a climax species that occurs at high elevation sites and grows in mixed stands or as a naturally occurring monoculture. Management activity within the project area has reduced some of the overstocking and surface fuel accumulation in areas dominated by red fir; however, much of the red fir forest within the project area appears to be extremely unhealthy due to the combined effects of fir dwarf mistletoe infestation and Heterobasidion root disease. Dwarf mistletoe infestation has made red fir trees susceptible to Cytoposa canker, which infects mistletoe scars, while root disease has weakened tree structure and increased susceptibility to bark beetle attack. As a result of the root disease, mistletoe infestation, and Cytoposa canker, red fir forest stands have moderate to low live canopy with 10 to 30 percent dead branches and small crowns with deformed branches. These conditions have contributed to high wildfire susceptibility in red fir-dominated portions of the project area, which are considerable in extent (33 percent of the project area).

Forest vegetation within the project area is not within the natural fire return interval for the applicable California Wildlife Habitat Relationships types. For red fir forest, the natural fire return interval is medium (5 to 150 years) and fire intensity is low to moderate and seldom very destructive. The normal fire season for red fir is summer to early fall and stand-replacing fires are rare. The Sierran mixed conifer forest has a short fire return interval with low to moderate fire intensity and burns in summer to early fall. Surface fires in mixed conifer typically occur every 5 to 10 years and mixed severity fires occur about every 50 years. Historically, surface fires and drought were key factors in maintaining open tree canopies in Sierran mixed conifer forests (Sawyer et al. 2009).

Forest Plan Direction

Forest Plan fire and fuels management goals include reducing threats to communities and wildlife habitat from large, severe wildfires and re-introducing fire into fire-adapted ecosystems.

Broad-scale goals include treating fuels in a manner that significantly reduces wildland fire intensity and rate of spread, thereby contributing to more effective fire suppression and fewer acres burned. This includes managing hazardous fuels with strategic placement of fuels treatments across broad landscapes to modify wildland fire behavior (USDA 2017:13). Forest Plan standards and guidelines for fuels management, activity fuels, fuel breaks, and plantations (USDA 2017:33-38). The following fire and fuels objectives have been identified for the proposed action, and are consistent with the standards and guidelines identified in the Forest Plan:

- Strategically place treatment areas across the landscape to facilitate the re-introduction of fire, interrupt fire spread, and reduce the size and severity of wildfires.
- Design mechanical treatments to achieve an average of four-foot flame length under 90th percentile weather and fire conditions.
- Decrease surface and ladder fuels to meet fire behavior objectives (reduced fire intensity and rate of spread, tree crowns thinned to meet design criteria of less than 20 percent probability of crown fire, and less than 20 percent mortality in dominant and co-dominant trees) under 90th percentile weather and fire conditions, with treatment being effective for a period of at least 10 years.
- Treat ridge tops and upper third of the slopes to implement fuel breaks in large expanses of continuous fuels, increase suppression opportunities, and provide control points for prescribed fire and fire management activities.

Environmental Consequences

Direct and Indirect Effects

Wildfire risk for forested stands and landscapes is characterized by the potential for fuels to generate specific fire behavior and effects. Fuel reduction through vegetation management activities, like those represented by the proposed action, have been demonstrated to be successful in reducing the intensity (energy released, flame length, and rate of spread) and severity (damage to the forest overstory and associated changes in resource values) of wildfires, and creating favorable conditions for firefighting. Fuel reduction has proven especially successful where it is targeted at protecting specific resources in limited geographic areas, such as in areas of high fire danger or in the WUI (Loudermilk et al. 2014). Treated areas typically exhibit different fire progression characteristics and reduced fire severity from areas that are not treated (Lydersen et al. 2017, Johnson and Kennedy 2019). Where fuels treatments have occurred, the pattern of wildfire progression becomes limited in some areas to low-intensity underbrush and surface burning, which can create safe conditions for firefighters to successfully suppress fires. A reduction in surface, ladder, and crown fuels can enhance fire suppression capabilities by minimizing fire behavior and reducing the ability of a surface fire to transition into a crown fire. Scorch height and related tree mortality may be decreased, as well as the potential for crown fire initiation. Fuel treatments also promote faster forest recovery post-fire by causing less damage to soils and leaving some live vegetation within burn areas (USDA 2009), protecting resources such as soils, wildlife, riparian function, and wetlands (Kim et al. 2013). Quantitative modeling has provided robust empirical support for the basic principles of mechanical thinning treatments that increase canopy openness while retaining the largest trees in a stand, coupled with the reduction of surface fuels through prescribed burn (Martinson and Omi 2013). Prescribed burning has been shown to have the greatest benefit in moderating fire behavior, compared with all fuel treatment activities types, when paired with mechanical thinning operations to manage stand structure before initiating burns (Martinson and Omi 2013).

The proposed action would reduce the existing and future fire hazard to the public and firefighters and provide for increased protection of natural resources. Treatment of surface fuels usually results in efficient fireline construction rates, so that the control can dramatically improve after fuels treatment, thereby aiding with fire suppression and reducing the negative effects of wildland fire. Fuel treatments would reduce potential fire severity and eventually allow fire to function as a natural process, helping to restore key ecosystem components and processes over time. Proposed treatments would create varying stand density and structure influenced by aspect, slope position, site productivity, tree species, and unusual micro-site conditions. Fire behavior and severity depend on the properties of both live and dead fuels, and the horizontal and vertical continuity of fuel strata. Treatments would reduce existing surface, ladder and crown fuels to help facilitate the re-introduction of fire. A reduction in surface fuels would be expected to reduce predicted flame lengths to four feet or less within the project area, and would reduce the probability of entire trees, or groups of trees, going up in flames. Wildfire behavior can be modeled based on specific variables including the characteristics of surface and canopy fuels, wind speed and direction, relative humidity, and slope steepness. Because fire prescriptions are written following a NEPA determination during the pre-implementation phase of a field season, fire modeling would occur during pre-implementation treatment planning to ensure that the above standards and guidelines from the Forest Plan would be met. In some cases, removal of trees from the canopy and understory could conceivably increase surface wind movement (Albini and Baughman 1979) and facilitate

drying of live and dead fuel (Pollet and Omi 2002), although effective removal of ladder and surface fuel should mitigate these factors by reducing the fuel load and potential fire spread. Observations and post-fire assessments confirmed that spot fires were contained or went out on their own in treated areas (Fites and others 2007). Prescribed fire in spring or late fall when conditions are moist can reduce surface fuels in riparian corridors, maintain larger diameter logs, and reduce secondary fire effects.

Prescribed burns would be designed to reduce surface fuels according to the following initial list of parameters: fire line intensity, burn index, one-hour, 10-hour and 100-hour fuel moistures, relative humidity, probability of ignition, temperature, wind speed and direction, slope and fuels. The prescribed fire plan would identify required resources that would be present on scene, equipment needs and would include a contingency plan. All prescribed fire prescriptions would be written in adherence to Stanislaus Fire Management Plan, and Interagency Prescribed Fire Guide.

Consequently, it is expected that the treatments implemented with the proposed action would reduce the intensity, severity, and frequency of wildfires within the project area from those that would be observed under existing conditions or under future conditions without implementation of the proposed action, and create favorable conditions for fire suppression activities. Additionally, conditions within the project area following treatments would be expected to be more naturally resilient to wildfire and facilitate faster recovery following wildfires. Without treatment of the project area, the purpose and need of the proposed action would not be met, fire behavior objectives identified in the Forest Plan would not be met, and over time the project area would further depart from desired conditions thereby increasing the probability of more intense and frequent wildland fire within the project area.

Cumulative Effects

As identified above, past, present, and reasonably foreseeable future actions related to wildland fire effects include fuels treatments, wildfires, and tree mortality related to drought and disease, both within the project area and on adjacent lands. One of the primary goals of the proposed action is to reduce surface fuels, increase canopy height, and increase canopy openness to reduce the risk of high-severity wildfires and decrease health and safety risks to firefighters and the public. Fire is both a viable fuel treatment tool and an important jumpstart for many ecosystems processes stalled by accumulating surface fuels and the absence of frequent burning. Recent fires, including the 2012 Ramsey Fire, which burned 1,137 acres immediately north of the project area, have reduced nearby fuels level, but such fires also have the potential to further reduce forest health and create conditions that are favorable to the introduction of fire-adapted invasive species that may increase fire risk in the future. Salvage logging after the Ramsey Fire helped to reduce fuel loads, and management actions by STF to control and eradicate invasive plant species have helped to mitigate the potential for catastrophic wildfire, but the risk remains high. Fuel conditions on adjacent private lands are variable and experience either sporadic treatments or burns that may change the vegetation structure; however, fuels treatments included in the proposed action would provide cumulative benefits to fire resiliency in the region. Mechanical treatment of fuels can allow fire, both natural and prescribed, to be used as a management tool. As the climate changes, managing the process or behavior of fire by manipulating vegetation may produce more resistant and resilient forests. Given current accumulations of fuels in some stands, multiple prescribed fires—as the sole treatment or in combination with thinning—may initially be needed, followed by long-term maintenance burning or other fuel reduction types to reduce crown fire hazard and fire severity. The proposed action, in combination with fuel hazard reduction activities and forest

health project and defensible space treatments on adjacent lands, or as a standalone project, would have a cumulatively beneficial effect on the risk of wildland fire both within the project area and regionally. Without implementation of the proposed action, the ability to suppress catastrophic wildland fire within the project area would be reduced, thereby increasing the wildfire threat in areas adjacent to the project area; equally, wildfires initiated on adjacent lands would pose greater threat to the project area because the project area would burn with greater intensity and rate of spread.

4. CONSULTATION AND COORDINATION

STF staff consulted with the following individuals and organizations during the development of this environmental assessment.

4.1. Interdisciplinary Team Members

Stanislaus National Forest

Jason Kuiken	Stanislaus National Forest Supervisor
Ray Cablayan	Stanislaus National Forest Calaveras District Ranger
Joseph Aragon	Stanislaus National Forest Calaveras District Resource Manager/CFLR Coordinator
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Carinna Robertson	Stanislaus National Forest Forester
Matt Hilden	Stanislaus National Forest Ecosystems, Fuels, and Prescribed Fire Staff Officer
Kellin Brown	Stanislaus National Forest Ecosystems, Fuels, and Prescribed Fire Staff Officer
Melinda Benton	Stanislaus National Forest Biologist
Crispin Holland	Stanislaus National Forest Wildlife, Range, Botany, and Aquatic Program Manager
Kathy Strain	Stanislaus National Forest Heritage Resource and Tribal Relations Program Manager
Zachary Croyle	Stanislaus National Forest Hydrologist
Katie Wilkinson	Stanislaus National Forest NEPA Coordinator

Ascent Environmental, Inc.

Curtis Alling	Principal/Project Director
Adam Lewandowski	Project Manager
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Steve Henderson	Senior Technical Review (Biology)
Lara Rachowicz	Senior Biologist
Allison Fuller	Wildlife Biologist
Erin Kraft	Recreation, Public Safety, and Visual Resources
Phi Ngo	GIS Specialist
Michele Mattei	Document Production

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4.2. Entities Consulted

U.S. Fish and Wildlife Service

Tuolumne Band of Me-Wuk

Chicken Ranch Tribal Council

Washoe Tribe of Nevada and California

California Valley Miwok Tribe

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Chapter 4, "Consultation and Coordination"

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Appendix A

Design Features of the Prather Medusa Forest Resilience Project

Design Features of the Prather Medusa Forest Resilience Project

GENERAL

Design Feature Number	Design Feature Description
GEN-1	Where feasible, existing hardened surfaces, clearings, or disturbed sites will be selected for staging areas.

RECREATION AND SCENIC RESOURCES

Design Feature Number	Design Feature Description
REC-1	Where practical, piles prepared for physical removal, burning, or chipping will be located away from established trails or highly visible areas. If this is not practical, pile in the most suitable locations and complete the disposal phase at the earliest opportunity.

LAND USE

Design Feature Number	Design Feature Description
LU-1	In areas where treatment adjoins residential private lands, the use of equipment and work crews will be limited to between the hours of 7:00 AM and 7:00 PM.

FIRE AND FUELS

Design Feature Number	Design Feature Description
FF-1	To avoid contributing to fuel loading, large cut vegetation will be piled, chipped or removed from the site.
FF-2	Motorized equipment will be equipped with appropriate mufflers and spark arrestors in good working condition to minimize noise levels and fire risks.

HERITAGE AND CULTURAL RESOURCES

Design Feature Number	Design Feature Description
CUL-1	Flag and avoid all eligible or unevaluated heritage resources and traditional tribal use areas.
CUL-2	With the written approval of the Forest Service Heritage Program Manager, the following actions may occur within site boundaries: • Removal of hazardous fuel by hand prior to prescribed burn. • Directionally felling of trees away from site features prior to ignition of prescribed burn. • Removal of hazardous trees. • Mechanical shredding (to occur only in areas where soils remain undisturbed by treatments)
CUL-3	Pile burning will not occur within known heritage sites.
CUL-4	If unanticipated heritage resource sites are found during implementation, all work shall stop in the area that could adversely affect the resource. The Forest Service Heritage Resource Program Manager shall be contacted immediately, and work shall not proceed in the area until the heritage program manager has determined an appropriate course of action.
CUL-5	Operators would not knowingly disturb, alter, injure, or destroy any historical or archaeological site, structure, building, or object. If an operator discovers any cultural resource, the discovery would be left intact and reported to the authorized individual. Operators would maintain a 100-foot buffer between historic prospect pits, trenches, or other features and project related disturbance.

BIOLOGICAL RESOURCES

Design Feature Number	Design Feature Description
BIO-1	Water and Rock Sources a. Four potential water sources in or near the project area would be used during dust abatement: 1) Forest Road 5N14 at Little Rattle Snake Creek; 2) 6N89Y at Little Rattlesnake Creek; 3) 6N17 at Big Rattlesnake Creek; and, 4) a pond on 6N17 (Figure 8). One rock borrow source on 6N91E contains about 5 cubic yards of 6-inch rock material in storage at this location. No additional soil or borrow sites in the project area would be used. b. Surveys to detect the presence of Forest Service sensitive plants would occur prior to any water source or soil development between April and August. If sensitive plant populations are present, treatments would be adapted to minimize mortality or disturbance, or, if possible, transplanting would be conducted.
BIO-2	Sensitive Plants a. No treatments or mechanical operations would occur on lava caps or rock outcrops, unless surveys confirm that sensitive plant species are not present, or the deciding official approves treatments or operations after consultation with a qualified Forest Service Botanist. b. A qualified Forest Service Botanist would be consulted for road treatments that occur near sensitive plant occurrences. c. Protocol surveys for sensitive plant species will be conducted prior to treatment activities that have the potential to adversely affect sensitive plants. d. If surveys identify sensitive plant species near road treatments, native plants or seeds will be gathered and propagated in appropriate, treated areas to reduce competition with brush growth.

Design Feature Number	Design Feature Description
	e. Surveys will also identify priority invasive plant species.
BIO-3	Limited Operating Periods a. The following Limited Operating Periods (LOPs) would be established for vegetation treatments. The Forest Service may waive spotted owl and goshawk LOPs if surveys confirm that these species are not nesting, or for vegetation treatments of limited scope and duration, when a biological evaluation determines such projects are unlikely to result in breeding disturbance. 1. Within 0.25 miles of a known spotted owl activity center (or PAC boundary if activity center is unknown) from March 1 through August 15. 2. Within 0.25 miles of a known goshawk activity center (or PAC boundary if activity center is unknown), from February 15-September 15. Where a biological evaluation concludes that a nest site would be shielded from planned activities by topographic features that would minimize disturbance, the LOP buffer distance may be modified.
BIO-4	Invasive Species/Noxious Weeds Actions that apply to all restoration treatments to reduce the risk of noxious weed incursion include: a. All off road equipment (logging and construction machinery, except for log trucks, chip vans, service vehicles, water trucks, pickup trucks, cars, and similar vehicles) must be free of soil, mud (wet or dry), seeds, vegetative matter, or other debris that could contain seeds in order to prevent new infestations of noxious weeds in the project area. Dust or very light dirt which would not contain weed seed is not a concern. b. Slash may be used in lieu of straw for protection of areas susceptible to erosion. c. Weeds may be pulled, cut, and/or hand dug in stands prior to, during, and after contract operations to minimize spread and expansion. Any digging would be done in consultation with the Heritage Resource Specialist and a qualified Forest Service Botanist. d. If priority weeds cannot be avoided within a treatment unit, work in uninfested portions of the unit first to the extent practical and require equipment cleaning to remove all soil, mud, vegetative matter or other debris that could contain seed prior to moving out of the infested unit.

SOIL AND WATER RESOURCES

Design Feature Number	Design Feature Description
SW-1	Activities within riparian conservation areas (RCAs) will follow the equipment and operating specifications in *Riparian Conservation Area Equipment and Operating Specifications* (see table below).
SW-2	The following slope limitations apply to equipment use in implementing the Proposed Action: • Dozer piling will be limited to slopes less than 25 percent. • Skidding with rubber-tired or fixed track equipment will be limited to slopes less than 35 percent. • Low ground pressure tracked equipment will be limited to slopes less than 45 percent.

Design Feature Number	Design Feature Description
SW-3	In locations within the project area where conditions limit suitability for the use of rubber-tired skidders, (e.g., in areas with slopes equal to or greater than 35 percent or shallow soils), the desired soil condition after treatment is to limit detrimental soil disturbance to less than 15 percent of the treatment area. Visual indicators of soil disturbance include removal of the forest floor (vegetative parts in various stages of decomposition above the soil surface), topsoil displacement, rutting, and soil compaction. Treatment options that will be applied to limit detrimental soil disturbance for lava caps, thin soil (limited rooting depth of about 25 inches deep), steep slopes (greater than 35 percent), and long skid distances in areas proposed for tractor logging are summarized in *Soil Conditions that Require Special Treatment Considerations*.
SW-4	Soil cover will be retained in the following amounts and conditions: • 50% cover will be retained on slopes less than 35 percent. • 60% cover will be retained on slopes equal to or greater than 35 percent. • 70% cover will be retained in RCA transition zones.
SW-5	Ground-based equipment will only be operated on dry soil with soil strength and bearing capacity capable of supporting mechanical equipment.
SW-6	In all aspen meadows and special aquatic features (SAFs; Includes lakes, meadows, fens, bogs, wetlands, vernal pools, and springs) with planned thinning operations, the boundary of the RCA exclusion zone will be reviewed by a Forest Service soil scientist or hydrologist and mapped with a GPS.
SW-7	Waste disposal areas will be designated before operations begin. Prohibited waste disposal areas include slopes with a high risk of mass failure, areas subject to overland flow (e.g., convergent areas subject to saturation), and RCAs. Excess or unsuitable materials will be deposited only in designated waste areas. Adequate surface drainage and erosion protection will be provided in waste disposal areas.
SW-8	Waste material from project activities will not be side cast into RCAs.
SW-9	Existing skid trails will be used wherever possible, except where unacceptable resource damage may result. Skid trails will be located a minimum of 50 feet from intermittent and ephemeral streams and SAFs and will be designed and situated to fit the terrain, volume, velocity, concentrations, and direction of runoff in a manner that minimizes erosion and sedimentation. When operations are complete, main skid trails and temporary roads will be subsoiled and waterbars and other erosion control features will be implemented on skid trails, as appropriate.
SW-10	Existing log landings will be used to the extent feasible. Where new log landings are required, they will be not be constructed within 100 feet of perennial or intermittent streams, or within 50 feet of ephemeral streams. All log landings will be covered with subsoil and stabilized when work is complete.
SW-11	**Road Stabilization.** Road reconstruction and maintenance activities will be scheduled during dry periods when the National Weather Service predicts zero percent chance of precipitation for at least 48 hours after implementation and stabilization of such activities. Project areas will be stabilized during the normal operating season when the National Weather Service predicts a 30 percent or greater chance of precipitation. Erosion control and stabilization measures will be installed before the start of the rainy season (November 16 through March 31). Stream crossings will be removed, rehabilitated, and stabilized before the rainy season, or following treatments, whichever is sooner. Project implementation will follow guidelines and restrictions identified in the STF wet weather operating guidelines.

Design Feature Number	Design Feature Description
	All areas will be stabilized with mulch, erosion fabric, vegetation, rock, organic matter, engineered structures, or other measures as stipulated in the Erosion Control Plan.
SW-12	**Road Construction**. Road construction within the project area will be carried out according to the following provisions: • The minimum area of disturbance required to carry out road construction will be identified before commencing ground-disturbing activities, and the area will periodically be monitored by Forest Service personnel to ensure that disturbance remains confined to designated areas and that the area of disturbance can be adequately stabilized before wet periods (see SW-12). • Slash generated by road construction will be used as erosion-control ground cover material. • Road cut, fill, and spoil disposal areas will be constructed in a stable manner. Cut and fill slopes will not exceed the angle of repose, and slopes will be stabilized with ground cover as needed near streams to prevent soil erosion and sedimentation. • Cross drains (e.g., rolling dips, culverts, waterbars) will be designed and spaced to minimize erosion. • Road drainage outlets will be designed to discharge onto non-erodible materials such as natural vegetation, rock aprons, and/or other energy dissipators.

SW-13	**Road Maintenance**. Road maintenance within the project area will be carried out according to the following provisions:
	• Road surfaces will be maintained with uniform drainage along the road utilizing:
	  • rolling dips where outsloped (preferred method of drainage),
	  • drains where insloped,
	  • drains where crowned.
	• Surface drainage will be designed to minimize hydrologic connectivity and maximize infiltration and dissipation.
	• Ditches and drainage structures will be cleared the minimum necessary number of times to maintain functionality, and features such as swales, ditches, shoulders, and cut and fill slopes with accumulating vegetation will be cleared.
	• Diversion prevention dips will be installed and armored where necessary.
	• Erosion control devices will be installed when conducting maintenance activities on hydraulically connected roads.
	• Seeps and springs will be diverted across roads and treated with erosion control if necessary.
	• Road maintenance activities will adhere to the road stabilization measures described above.

SW-14	**Borrow Sources**. If new borrow sources are required for road construction or maintenance, topsoil at the source will be removed and stockpiled for use as surface dressing in post-operation site rehabilitation. After operations are complete, the site will be rehabilitated and stabilized using the following steps: • Grade side slopes to ensure proper drainage • Smooth and stabilize pit area • Spread fine material over the bottom of the pit • Apply stockpiled or imported topsoil Seeding, soil amendments and mulching may be required for decommissioning. Installation of sediment basins and/or upslope diversions and berms or other sediment reduction measures will be considered. Temporary access roads to borrow sites will be decommissioned. System roads to quarries or borrow pits will be maintained.

Design Feature Number	Design Feature Description
SW-15	**Prescribed Fire.** To the greatest extent feasible, damage to obligate riparian vegetation (e.g. willows, alders, cottonwoods) will be avoided during project implementation. A minimum of 75 percent ground cover will be retained within 100 feet of perennial streams and 50 feet of intermittent streams. (Ground cover is defined as a minimum of one inch of organic litter, slash, duff, or loose rock fragments, as well as living vegetation less than five feet tall.) Direct ignition will not be done in RCAs; however, fire may back into the riparian area if ground cover is maintained. Fire lines will not be constructed in RCAs unless there is no alternative. New dozer lines will not be constructed within 100 feet of perennial and intermittent streams and 50 feet of ephemeral streams. Constructed fire lines will be restored upon completion of prescribed burning and/or before each winter. Restoration shall consist of water barring hand and dozer lines, re-contouring of benched trails, and subsoiling of detrimentally compacted dozer lines.
SW-16	Burn piles will be located a minimum of 50 feet away from perennial and intermittent streams and 25 feet from ephemeral streams. Piles will be located outside of areas that receive runoff from roads.
SW-17	Access roads will be watered as needed to prevent dust during hauling.

SW-18	**Water Sources**. The following provisions apply to water sources used for road watering and fuel treatment activities:
	• The use and/or installation of permanent water sources, such as piped diversions to a storage location, will be used, wherever possible, in preference of temporary water source developments. Water drafting intakes will be located to avoid adverse effects to in-stream flows and depletion of pool habitat. Storage basins will not be constructed at culvert inlets as such placement can accelerate blockage of the culvert.
	• Fish passage will be provided where temporary dams are installed on fish-bearing streams to create a drafting pool. Temporary dams will be removed when operations are complete in a manner that does not cause sedimentation of the waterway. When diverting water from streams, bypass flows shall be maintained that ensure continuous surface flow in downstream reaches and keep habitat in downstream reaches in good condition.
	• Access approaches will be oriented as close to perpendicular as possible to prevent stream bank excavation.
	• Road approaches and drafting pads will be treated to prevent sedimentation and will be armored from the end of the approach to a stream to the nearest of:
	  • 50 feet,
	  • the nearest drainage structure,
	  • the nearest distance that water drains away from the watercourse.
	• Areas subject to high flood events will be armored to prevent erosion and sedimentation of waterways.
	• Water drafting pumps with a low entry velocity will be used to minimize removal of aquatic species (such as juvenile fish, amphibian egg masses and tadpoles) from aquatic habitats. Screening devices will be applied to water drafting pumps.
	• For fish-bearing streams, the water drafting rate should not exceed 350 gallons per minute for streamflow greater than or equal to 4.0 cubic feet per second (cfs). Below 4.0 cfs, drafting rates should not exceed 20 percent of surface flows. Water drafting should cease when bypass surface flows drop below 1.5 cfs.
	• For non-fish-bearing streams, the water drafting rate should not exceed 350 gallons per minute for stream flow greater than or equal to 2.0 cfs. Drafting rate should not exceed 50 percent of surface flow for non- fish-bearing streams. Water drafting should cease from non-fish-bearing streams when bypass surface flow drops below 10 gallons per minute.

Design Feature Number	Design Feature Description
SW-19	All water-drafting vehicles will be checked daily and repaired as necessary to prevent leaks of petroleum products from entering RCAs. Water-drafting vehicles will contain petroleum-absorbent pads and be placed under vehicles before drafting. Water- drafting vehicles shall contain petroleum spill kits. Absorbent pads will eb disposed of according to the Hazardous Materials Response Plan.
SW-20	**Servicing and Refueling Equipment**. The following provisions apply to the use of combustion equipment used in implementing project activities: • Temporary refueling and servicing will be allowed only at approved sites located outside of RCAs. • A current Spill Prevention and Containment and Counter Measures (SPCC) plan is required where total oil products on site in above-ground storage tanks exceed 1320 gallons or where a single container exceeds 660 gallons. • Contour berms and trenches will be installed around vehicle service and refueling areas, chemical storage and use areas, and waste dumps. Ground liners will be used to prevent seepage to groundwater. • Spills will be reported, and appropriate clean-up action initiated in compliance with state and federal laws and regulations. The forest hazardous materials coordinator's name and phone number will be available to Forest Service personnel who administer or manage activities utilizing petroleum-powered equipment. • Contaminated soil and other material will be removed from National Forest System lands and disposed of in compliance with controlling regulations.
SW-21	**Stream Crossings**. Streambank disturbance at crossings will be kept to a minimum, and any disturbance will be stabilized and mitigated. The number of stream crossings will be kept to the minimum necessary to access the site. Ford crossings will be armored with boulder-sized or larger rock fill at entry and exit points. Base material for rock fill will be clean rock, 6 inches or larger in size, with smaller running course if needed. Excess material from the installation of culverts and stream crossings will be disposed of in a manner such that it will not reenter the stream channel. Culverts and stream crossings will be designed so that they do not create a barrier to passage for aquatic species that may be present at the site.
SW-22	Borate compound will not be applied within 10 feet of surface water when the National Weather Service predicts a 30 percent or greater chance of precipitation, or during precipitation. Applicators will follow all state and federal laws and regulations regarding the application of herbicides.

Riparian Conservation Area Operating and Equipment Specifications

Stream Type	Distance from RCA feature (ft)	Allowed Equipment[1,2]	Resource Element	Operating Requirements
Perennial/SAF[3]/Intermittent	0-15	Mechanical Harvest/Shred: Prohibited Hand Treatments: Allowed	General	No mechanical entry Trees must be felled away from stream and removed by cable
	0-50	Skidding: Prohibited	General	No skidder entry Trees must be felled away from stream and removed by cable
	15-50	Mechanical Harvest/Shred: Allowed	General	Mechanical treatments allowed only when using tracked vehicles that exhibit low ground pressure.
			Soil Strength	Operate only when 90% of total tracked area is rutted <4 inches deep
			Soil Cover	Operate only when continuous ground cover is retained in 90% of the total tracked area
			Streamcourse Debris	Remove operations-created debris from stream channels
			Vegetation	Retain obligate riparian shrubs and trees (e.g. willows, alder, aspen)
	50-100	Skidding: Allowed	General	Mechanical treatments using rubber-tired skidders are allowed
			Soil Cover	Retain minimum 70% ground cover overall in transition zone Retain minimum 50% evenly distributed ground cover in areas traveled by tires or tracks
			Skid Trails	Use existing skid trails except where unacceptable impact would result. Do not construct new skid trails within 100 feet of stream
			Stream Crossings	The number of crossings should not exceed an average of 2 per mile.
	100-300	Mechanical Harvest/Shred: Allowed Skidding: Allowed	Skid Trails	Density and intensity of skid trails will gradually increase as distance increases from the Transition Zone
			Soil Cover	Approximately 40% ground cover must be maintained in this zone

Stream Type	Distance from RCA feature (ft)	Allowed Equipment[1,2]	Resource Element	Operating Requirements
	100-150	Mechanical Harvest/Shred: Allowed Skidding: Allowed	Skid Trails	Density and intensity of skid trails will gradually increase as distance increases from the Transition Zone
			Soil Cover	Approximately 40% ground cover must be maintained in this zone
			Vegetation	All trees that have their root system incorporated into the integrity of the stream bank would be retained
Ephemeral	0-15	Mechanical Harvest/Shred: Prohibited		
	0-25	Skidding: Prohibited		
	15-25	Mechanical Harvest/Shred: Allowed		
	25-50	Mechanical Harvest/Shred: Allowed Skidding: Allowed	Soil Cover	Retain minimum 50% evenly distributed ground cover in areas traveled by tires or tracks
			Skid Trails	Use existing skid trails except where unacceptable impact would result. Do not construct new skid trails within 50 feet of stream
			Stream Crossings	The number of crossings should not exceed an average of 3 per mile.

[1.] Mechanical harvesting and shredding equipment includes track-laying machines with an articulating arm that have an operational radius of a minimum 20 feet, such as feller-bunchers and masticators.

[2.] Skidding equipment includes rubber-tired skidders and track-laying tractors.

[3.] SAF = Special Aquatic Features. Includes lakes, meadows, fens, bogs, wetlands, vernal pools, and springs.

Soil Conditions that Require Special Treatment Considerations

Soil Condition				Treatment	
Lava caps	**Thin soils**	**Steep slopes (>35%), High displacement**	**Long skid distances**	**No.**	**Specification**
		X		(1)	Keep rubber-tired skidders on slopes <35%, end-line short, steep pitches (>35% and less than 100 feet)
	X	X	X	(2)	Exclude from treatment difficult to reach areas that would require skid trails on slopes >35%
		X		(3)	Use a feller-buncher to pack trees to slopes <35%. This option may not work for larger trees. Operational limit of feller-buncher varies from 40-45% slope, depending on soil and bedrock type. Special equipment (e.g. excavator) may be required.
	X	X	X	(4)	Aerial harvest where topography is favorable, and a considerable portion of unit is steep (>35%).
		X		(5)	Use fixed track grapple skidders on steep pitches (>35%). Recontour displaced soil. Special equipment (e.g. excavator) may be required.
	X	X	X	(6)	Flexible track (low ground disturbance) skidders may be used to yard biomass or sawlogs on 35-45% slopes (<35% where soils are thin), or where adverse skidding is necessary.
	X	X	X	(7)	Use cut-to-length equipment where long skidding distances are necessary; where thin soils or low nutrient soils are present over considerable acreage; or in plantations where soil quality is a concern.
		X	X	(8)	Use a hybrid ground-based/aerial system. The harvester or feller-buncher cut trees to be removed by aerial yarding. Operational limit of feller buncher varies from 40-45% slope, depending on soil and bedrock type.
X	X	X	X	(9)	Log over snow operations
X				(10)	No ground disturbance
	X	X		(11)	Coordinate with soil scientist on layout for treatment numbers (2), (3), (5), and (8)